THE IRON AGE

New York, September 8, 1927

ESTABLISHED 1855 VOL. 120, No. 10

Heat Treatment Is Adding Steadily to the Effective Service of Steel and Non-Ferrous Metals—Greater Things Just Ahead

RAPID progress has been made in the applications of heat treatment since the convention of the American Society for Steel Treating at Chicago last September. In some directions the research has been carried on in close contact with other scientific developments, so that each line has profited by what has been brought out in the other.

That the year's advance might be presented authoritatively to its readers, THE IRON AGE brings together in this issue the thoughts of some of the leaders in current research. Our contributors have been asked to write in summary concerning recent progress and the probable trend of future effort. As will be gathered from what follows, heat treatment is more and more of a factor in foundry work; in tool and alloy steels new situations and new practice are appearing; in both electric and fuel heat-treating improvements in equipment are noteworthy; magnetic analysis, the microscope, the X-ray, and welding have brought a number of new features into the story of the year. In the non-ferrous field notable applications are recorded, and the work there has taken on new importance.

Heat Treatment—Lines of Future Progress

BY J. FLETCHER HARPER

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THE rapid strides of the metal industry in the past few years have startled many of the pre-war and war metallurgists into a realization of the inadequacy of their education. The development of heat-treated metals, special alloys, and welding in specialized industries has surpassed the general education of the technical man of several years ago. It is only by an active interest in the activities of our modern technical societies and trade publications that he can hope to keep abreast of the times.

The mysteries of the past are rapidly becoming known facts, while the problems and advances of today are the subjects reviewed in this publication and before the various technical societies' meetings in Detroit.

The trend of future developments is indicated today; and they undoubtedly will far surpass our present ideals.

The methods of heating metals should undergo further refinements with the various fuels, gas, oil, and electricity falling more naturally into their respective fields. The application of inductive and resistance electric heating should have a marked influence in this development, while further improvements in heating elements can well be expected. Marked improvements in the combustion of gas and oil will be the aim of the future.

The use of welded metals will undoubtedly affect the production of cast iron and cast steel. But new alloys and heat treatments will allow the progressive foundry to maintain its production in intricate shapes and in metals for specific purposes such as wear, magnetic properties, etc. The mechanism of welded joints, the heat treatments of welds are subjects which will be solved and rapidly advance this type of construction.

The non-ferrous industry, one of the world's oldest industries, is making and will make great progress in new alloys and new heat treatments. The theories on hardening of alloys are just beginning to find application in manufacturing. A better understanding of these should give us many new materials of construction. Weight, strength, corrosion resistances, wear, and erosion should all fall before the proper application of these new alloys. Aeronautics and higher speed machinery will do much to develop the non-ferrous field.

Advancement in the stainless and heat-resisting alloys can be expected. High temperature and pressure equipment will demand improved materials, while

economic considerations will widen the use of corrosion and rust-resisting alloys.

Tool steels, which have undergone no radical change in the last few years but only a series of refinements, can be expected to be partially replaced by better alloys. Higher speed and longer life of tools and dies can be looked for and predicted for these new materials.

With the development of new and better forming and cutting materials, improved construction of machine tools will be in order. Extension in the use of high-grade alloys for gears, clutches, bearings, and shafts will be demanded by the future buyer.

Needs for greater strength, less weight with higher operating speeds are the coming demands of the machine tool industry, power equipment builders, and railroads. The needs will be answered by new alloys, by new heat treatments, by the extension of present materials into new fields, and by the application of welding.

Steel Castings—Heat-Treating Methods and Furnaces Improved

BY R. A. BULL

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IT would be superfluous to elaborate on the fact that the heat treatment of steel castings was greatly stimulated by the World War. Interest in the subject has not only been maintained but has lately been intensified with constructive results, as evidenced by several developments to which we will refer.

At the June, 1927, convention of the American Society for Testing Materials, definitions of heat treatment terms submitted by a joint committee representing that society, the Society of Automotive Engineers and the American Society for Steel Treating were tentatively accepted by the A. S. T. M. Presumably the S. A. E. and A. S. S. T. will soon officially report action similar to that of the A. S. T. M. The joint committee has spent several years in the difficult effort to harmonize opinions regarding terms that should be employed.

The application of these joint technical society definitions to steel foundry practice has a particularly interesting aspect. This concerns the new definition of annealing, now stated broadly to be "a heating and cooling operation of a material in the solid state." A supplementary note explains that "annealing usually implies a relatively slow cooling." Thus it is made clear that normalizing, which according to previous interpretation as well as the joint committee's report, means "the heating of iron-base alloys above the critical temperature range followed by cooling to below that range in still air at ordinary temperature," is a phase of annealing as now defined. This differs from the use of terms in the steel foundry during the past few years, during which time the word annealing has been exclusively related to slow, or oven cooling.

Those who make and use steel castings have yet to look to the joint committee for a term now seriously needed, which not "usually implies a relatively slow cooling," but will always mean that. Assurance has been given that the joint committee will endeavor to supply the missing term. It is hoped this may be done without unnecessary delay to make complete a task for which credit is due those representing the three societies which appropriately combined efforts, the result of which should eliminate those uncertainties that have often existed regarding heat treatment terms employed differently by individuals.

Significant developments have occurred during the last few years, in the construction of furnaces for heat treating steel castings. Not the least important of these resulted in several installations of electrically heated furnaces. Automatic heat control, a feature of such units, is an important factor. Not only in the complicated designs of electric ovens, but in the simpler designs of gas and oil-fired ovens have ingenious, effective details been developed for obtaining more thorough heat distribution.

It was found that roof construction, burner design, and provision for tightly closing furnace doors were capable of great improvement, with resulting benefit to fuel consumption and to the condition of the castings. The amount of scale formed during annealing operations has been reduced by the diminution of oxidizing conditions in the furnace. Efforts to improve construction will be continued with resulting advantage to producers and consumers of the product.

During the current year, a subcommittee of the A. S. S. T. committee on recommended practices has been preparing a recommended practice for heat treating carbon steel castings. When this article was written the committee's report had not been announced. With the adoption of the A. S. S. T. recommended practice there will be provided two such sets, one consisting of the recommended practice of the A. S. T. M. for heat treating carbon steel castings, promulgated in 1914, and last revised in 1924. It is probable that the A. S. S. T. recommended practice will be more elaborate than is that of the A. S. T. M. Both are intended solely for guidance and not for inclusion in specifications.

One of the four A. S. T. M. specifications for steel castings was subjected during recent years to a revision that amplified the prescribed methods of heat treating. Meanwhile a new A. S. T. M. specification for steel castings, yet occupying a tentative status, has been developed, containing heat-treating clauses of a fairly comprehensive nature. These wholesome indications will undoubtedly be followed by others that will safeguard consumers of high-grade steel castings, and accordingly meet the views of those who make such a product.

Much has been done recently in the improvement of heat-treatment methods for special steels used for castings. A subcommittee of the Testing Society has been requested to develop specifications for alloy steel castings, including the heat

treatments adapted to them. The nature of the problem is such as to require considerable time for solution. Numerous steel foundrymen are vigorously at work on it, and from time to time will report the results of their researches. Thus we may confidently state that the product of the steel foundry will be of increasing value to the innumerable industries served by it.

Malleable Castings—*New Thermal Treatments Have Changed Processes*

BY ENRIQUE TOUCEDA

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WHILE carbon and alloy steels lend themselves with great nicety to the effects of heat treatment, this is true to a very limited extent in the case of either malleable, or wrought iron, its nearest structural neighbor, owing to the presence of but a minute amount of combined carbon in these products; that is, no heat treatment yet devised will materially enhance the tensile properties of malleable iron; produce hardness without inducing prohibitory brittleness; or enable the product to be machined at a higher speed than is practicable with the product as marketed, for the castings as sold can be machined more rapidly than any other ferrous product.

Malleable iron has the following average tensile properties: An ultimate strength somewhat in excess of 53,000 lb. per sq. in.; a yield point of about 36,000 lb. per sq. in., and an elongation in 2 in. of about 18 per cent. The product is soft, ductile, and tough and has an average Brinell hardness of about 115. Structurally, it consists of a ground mass of ferrite, throughout which is quite uniformly distributed small nodules of temper carbon, a structure that will remain stable up to the critical point. At a temperature slightly beyond this the temper carbon will start gradually to combine with the amorphous iron at the grain boundaries and, with increase in temperature, it will be found to have uniformly diffused into the grain itself.

At 1650 deg. practically all of the temper carbon will be obliterated, and upon cooling a specimen without quenching, the structure will be found to consist of a ground mass of pearlite, although at times there still may remain some minute traces of temper carbon. While a test bar thus treated will have a fairly high strength and be harder than the normal product it will be brittle, particularly under impact. If heated to above the critical and quenched it will be very hard but exceedingly brittle.

The author knows of no instance where such a treatment imparts usefulness, except in the case of spot or surface hardening, the heating being accomplished by means of an acetylene torch, the spot or surface being quickly quenched by a water spray. This procedure is of limited application.

On the other hand certain heat treatments for special purposes have been developed which have resulted in value to the industry, as for example in the heat treatment of castings which are to be hot galvanized. For many years it was a well-known fact that even castings of exceedingly superior quality would in many instances become embrittled upon being subjected to the hot-galvanizing process. Through a research by Leslie H. Marshall the following facts were ascertained: If the castings are heated to around 1200 deg. Fahr. and quenched in water around 175 deg. Fahr., no embrittlement upon hot galvanizing takes place.

Malleable iron cannot be case hardened with a carbon case, for to accomplish this it would be essential to heat the castings to above the critical range which, as has been explained, embrittles the metal. There is a possibility that a nitrogenous case safely may be obtained as this process is conducted at a temperature much under that of the critical range.

Gray Iron Castings—*Normalizing and Annealing Now Commercial*

BY J. W. BOLTON

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IRON castings are, if anything, more difficult to heat treat than steel castings or forgings. First, cast iron is a more complicated material, it has a greater number of structural components, and these are in states very far removed from equilibrium. It has much larger percentages of impurities, particularly the "non-metallic" ones. Cast iron is easily cast into intricate shapes, and every heat treater knows what that means. Furthermore, at higher temperatures many cast irons "grow", or expand permanently. Consequently, many enthusiasts are likely to underestimate the practical problems which may be encountered.

Ordinary gray iron is a mechanical mixture of pearlite, ferrite, and graphite flakes. It also contains an appreciable percentage of the phosphorus rich component, steadite. In "normalizing" operations, the object is not the changing of these structural forms, but simply the relieving of casting or other internal stresses. Therefore the majority of manufacturers normalize between 700 and 900 deg. Fahr.

Stressed castings may be discovered by cutting partly through here and there with a hacksaw; if the kerf springs apart or closes together, a stress exists. Stressed castings will neither spring nor close after proper normalizing. Furthermore, they are not likely to warp after machining.

Stresses seem more common in small or medium castings than in large—perhaps because of the relatively slow cooling of the latter. However, the writer has seen a 35,000-lb. casting crack when sit-

ting on the machine. He has utilized "normalizing" operations successfully on castings from a few pounds up to 25,000 lb. Set up in the furnace to avoid warpage, and do not put small castings into a hot furnace—they may crack. A few hours normalizing may save weeks of aging.

In "annealing", the castings are carried up somewhat above the Ac_1 point and cooled slowly through the Ar_1 point. (The Ar_1 point for most commercial irons is around 1350 deg. Fahr.) The time necessary is lower, the higher the temperature and the smaller the casting—ordinary test bars may be almost completely annealed by a very few minutes at 1600 deg. followed by slow cooling. The pearlite is broken down into ferrite and graphite, the combined carbon approaching zero. This makes the metal softer (100 to Brinell, as compared to 160 to 210 for ordinary castings), somewhat more malleable, and appreciably weaker.

Unless the annealing is at a very high temperature, the grain structure may be as fine as that of the original casting, in spite of the increased graphite. Ordinarily, the steadite is unaffected, but at long anneals at temperatures approaching 1800 deg., it is absorbed in solid solution in the ferrite. Annealing gray iron is essentially a graphitizing reaction. There is no massive cementite to be broken down and some 75 per cent of the reaction has taken place during the casting operation itself, hence the process is far more rapid than malleable annealing.

From the above it is at once apparent why quenching or "hardening" is a rather complicated operation. The process looks easy—heat to somewhat above the Ac_1 point, quench and then draw to the required hardness. But suppose we take a bar with 1.25 per cent silicon, 3.40 per cent carbon, heat it to 1500 deg. and quench in water. Fracture will be fine and silky, almost like high-speed steel. The metal may be somewhat hardened, possibly to 250 Brinell. Quench it from 1600 deg. and it may be 450 Brinell, not nearly as brittle as white iron, and under the microscope showing martensite in an apparently austenitic matrix.

The reason for this is that the solubility of combined carbon increases with the temperature from nil at equilibrium conditions just below A_1 to 1.7 per cent carbon in pure iron-carbon alloys at the eutectic temperature. That is, the actual percentage of hardening carbon increases with increase in quenching temperature up to 2000 deg. Fahr. This condition is not met with in steel. Furthermore, if the casting is brought slowly to slightly above the critical and quenched (the ideal point for most steels), the metal may be actually softened. Variations in behavior may be encountered in irons of different composition. Drawing phenomena of cast irons are quite similar to those of steels.

From the above it may be gathered that normalizing and annealing operations for gray iron have proved in general commercially practical and are in common use. Proper methods of quenching and drawing for every type of iron have not been thoroughly worked out, and hardening processes are uncommon in commercial practice. For certain limited applications hardening processes appear attractive but the field is narrow and close control is necessary.

Case Hardening—Progress Made in Lower Costs; "Normal" Steels

BY M. T. LOTHROP

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CASE-HARDENED parts of automobile and kindred construction continue to be used in the face of repeated attempts to replace them with direct hardening steel. The continuous urge for lower costs has caused these attempts, for, contrary to the rather widespread idea, case carburizing is a relatively expensive series of heat treatments, and carburizing steels are just as expensive as the corresponding direct hardening steels, because it is poor economy to heat treat inferior steel.

The reason for case-hardened parts for special applications lies in the fact that such parts possess essential properties that cannot be duplicated in direct hardening steels. The combination of toughness and resistance to wear that can be conferred on a high-grade carburizing steel by scientific carburizing and hardening is unique.

Considerable progress has been made in lowering the cost of the process, and at the same time improving the quality of the work. The main factors are:

1.—Marked advances in the design and efficiency of carburizing furnaces.
2.—Better and cheaper carburizing compounds.
3.—Carburizing containers of improved design and lighter section sold at a lower price per pound.
4.—"Fine grained" steels which respond satisfactorily to a single quenching treatment, thus eliminating the first or so-called "regenerative quench," lowering the cost and also reducing distortion.

Pack hardening is expensive because the carburizing compounds are poor conductors of heat, and the weight of the container plus carburizer generally exceeds that of the work.

Gas carburizing relieves these fundamental weaknesses. In this process the work is placed in a retort, and when the charge is uniformly heated carbonaceous gas flows slowly and continuously through the retort. Here it comes into contact with the work, which becomes carburized to a depth closely controlled by governing the time and temperature. It lowers the cost of carburizing in four ways:

1.—Carburizing gas generally costs less than the necessary solid carburizer.
2.—More work per cubic foot of container; thus it turns out more per heat-hour. The life of a container is, of course, measured in heat-hours.
3.—Less labor is required for charging the retort than for packing and charging the box.
4.—The work heats more quickly, due to the absence of packing material and the fact that the retort does not cool off much between heats.

From the standpoint of quality, also, the gas method is advantageous, provided a suitable gas of uniform composition from day to day is available. This is due mainly to the better control over the vital factors of time and temperature; carburization is not allowed to begin until the steel has been uniformly heated to the proper temperature and the distribution of carbon in the case may be modified by the simple expedient of shutting off the flow of carburizing gas and continuing the heating until diffusion has proceeded to the desired degree.

Originally coined to differentiate between steels which responded normally to commercial case-hardening practice and those which did not, the terms "normal steels" and "abnormal steels" have in the course of time taken on new meanings. As a result there has been considerable disputation regarding the "normality" of various steels, and the steelmaker has been the unfortunate victim.

As originally stated by Messrs.

McQuaid and Ehn, a steel to be classed as "normal" must, when carburized under standard conditions, exhibit large, well defined pearlite grains surrounded by a cementite network, with no suggestion of distintegration or divorce of the pearlite. It soon became apparent that the large grain is non-essential. A steel that develops a large grain size in the McQuaid-Ehn test has a tendency toward brittleness after hardening, while a steel that shows a small but well defined grain structure, free from divorced pearlite, responds as readily to the case-hardening operation and is stronger and tougher and has a much wider temperature range in hardening. It is this wide temperature range in hardening that makes single treating carburizing steel possible.

One of the most striking facts developed by the McQuaid-Ehn test is that different heats of steel of the same specification will develop a widely differing grain size during carburizing and therefore have a different susceptibility to grain growth. This determination is being made not only on carburizing steels but also on medium and high-carbon steels, simple and alloy, and much data have been accumulated in support of the proposition that, other things being equal, steels that are "small grained normal" in the McQuaid-Ehn test are physically superior to those that are coarse grained normal, particularly in impact strength.

Metallography—*Is Detecting Changes Caused by Thermal Treatment*

BY F. F. LUCAS

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METALLOGRAPHY is a very young branch of science but the art is widely practised in our technical and scientific life. It deals in the anatomy of metals and teaches how structure changes under the influence of mechanical or thermal treatments. Without metallography the heat treatment of steel becomes an operation guided by experience rather than reason. Search for a reason led the pioneers to establish the art of metallography. It is the means by which good, poor or indifferent heat treatments are explained on the basis of structure. With control of structure comes control of physical properties.

Some ten years ago, a survey showed that the microscope was regarded generally as an instrument which had yielded its basic store of knowledge. However, the record of actual accomplishment appeared to be hardly a tenth part of the potential resolving ability of the best optical systems. Seemingly with the tools at hand we were content to deal with relatively gross structures and speculate as to the actual nature of the smaller things. This led to the development of high-power metallography in the Bell Telephone Laboratories. Gradual improvements in technique led to better and better resolution. With resolution approaching the theoretical limits of available optics further steps into the structure of matter were taken with the ultra-violet microscope and the new objectives of very high resolving ability.

These improved methods break up some structures which heretofore had been regarded as solid solutions. We now are able to visualize the mechanism of hardening; to watch clearly what happens when hardened steels are tempered —and this is the very essence of heat treatments. In some cases the changes in structure arising from the addition of a few hundredths of one per cent of alloying element can be observed.

In so few words it is hardly possible to dilate on what may be the actual limit of vision and its relation to heat treatment of iron and steel. Suffice it to say that no one knows. We deal with particles of matter so small that they may be reckoned in terms of a few hundred atom diameters. They can be caused to grow or to disappear almost at will by suitable heat treatment. A vast field awaits exploration with interesting and fruitful possibilities.

Welding Industry—*Superior Welds May Need Heat Treatments*

BY S. W. MILLER

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AS fusion welding operations consist in locally melting metals together, the cooling being quite rapid, the resultant joint has peculiarities of structure and variations therein that are not met with anywhere else in metal working.

Because it is usually impossible (or at least very difficult and expensive) to apply heat treatment to fusion welded articles, it has become what may be called standard practice to produce welds which do not need heat treatment, but which have such physical properties in the "as made" condition as will give safe and satisfactory results in service. When this is done intelligently, there is no danger of failure—and there are plenty of successful instances in proof of this statement.

The usual method of design is to employ a welding metal that, in the weld, will be stronger than the base metal, or, if it is about of the same strength, to reinforce the weld so that its strength per linear inch will be somewhat greater than that of the base metal, and thus any rupture would occur outside of the weld.

In steel, for instance, the usual base metal is ordinary steel plate, that has an ultimate tensile strength of 60,000 lb. per sq. in. Low-carbon steel welding rod will produce a weld of 50,000 lb. per sq. in. ultimate strength, so that, with accuracy enough for most purposes, a reinforcement of 20 per cent will give a safe structure (though there are exceptions to this statement, as well as other considerations that space will not permit discussion.)

There are also commercial steel

welding rods that will give an ultimate tensile strength of much over 60,000 lb. per sq. in., and it is entirely possible to make welds of 120,000 lb. ultimate strength, with 10 per cent elongation in 2 in. over the weld, using special materials.

The foregoing refers to welds not heat treated. Welds made with low-carbon wire obviously cannot have their tensile strength increased by heat treatment, though their ductility may be made greater, always provided that they are clean and free from oxides and other non-metallic impurities. However, it should be remembered that a clean weld has the same Young's modulus of elasticity as any other steel, so that, with proper design and good execution, the strain within the elastic limit is the same in both weld and base metals.

As fusion welding is studied and its applications increased, it will be increasingly necessary to pay more attention to heat treatment, and quite a little work has been done experimentally in special cases with satisfactory results. The principal difficulty is that the critical points of weld metal, and the time needed for changes to occur, are not the same as for the base metal, so the heat treatment is liable to be complicated and expensive.

But there is every reason to believe that, as the demand for superior welds increases, the applications of heat treatment to welds will also increase, just as other heat treatments have been developed to meet demands for increased physical properties required for severer service conditions.

Steel Springs—Only Alloy Steels, Heat-Treated, Meet Needs

BY G. L. NORRIS

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IN developments in the heat treatment and use of alloy steels for springs, the field may be roughly divided into two large groups: Automotive and railroad springs. It is recognized that there are immense quantities of springs used in other lines, some of them subjected to highly refined heat-treating methods, as for example clock and watch springs. In automotive and railroad springs we find a great contrast in the methods of manufacture, particularly in the use of alloy steels and the methods of heat treatment.

The automotive industry, with an annual production now of approximately 4,000,000 cars, buses and trucks, requires the mass production of hundreds of thousands, and even millions of springs of identical dimensions. These must all be of high uniform quality to ensure comfortable riding and safety and to protect the vehicle from damage from road shocks. For the motor vehicles produced in 1926, there were required over 15,000,000 chassis springs, and in addition many thousands of springs were required for repairs. The production of these immense quantities of springs has resulted in the development of a highly specialized and technically controlled industry.

It was soon realized in the early stages of the industry that only by the use of alloy steel, properly heat-treated, could the necessary combination be obtained of high elastic limit, toughness, resiliency and fatigue resistance. Over 90 per cent of the automobile chassis springs produced in this country are of alloy steel, and made in plants equipped with automatic continuous heating furnaces with elaborate pyrometric control, and automatic shaping and quenching machines.

The alloy steels used for chassis springs are, with hardly an exception, chrome-vanadium, chrome, or silico-manganese steels, and of these by far the greater tonnage is of chrome-vanadium, which through many years has demonstrated its surpassing value by the ease and economy with which the requisite high quality can be uniformly attained in mass production.

Developments in heat treating in the automotive spring industry will be principally in the way of minor mechanical improvements in the furnaces, the use of electricity for heating and refinements in pyrometric control.

In the production of railroad springs there is practically no mass production, the nearest approach being coil springs for freight car trucks and draft gears. Automatic heating furnaces and pyrometric control are noticeably absent. The average annual production of railroad equipment for the past 15 years has been: Freight cars, 114,890; passenger cars, 1693; and locomotives, 3313. Since 1918 the production has been much less.

Practically all the railroad car and locomotive springs are made of carbon steel of a standard composition that has been in use for 40 years or more, and by shop methods that have been but little changed for a like period. The railroad spring shops, largely because of the absence of mass production, lack the automatic heating furnace equipment and elaborate pyrometric control of the automotive spring shops.

The railroad spring problem principally concerns the protection of the equipment and roadbed. With the increasing weight and capacity and cost of locomotives and cars, the need and economy of better springs is becoming more apparent, and the railroads are slowly beginning to realize that they can afford to pay more for better springs for the protection of their equipment. Until recently these conditions were met by increasing the number or size of the springs with no change in quality. This procedure has not been successful.

Within the past two or three years, quite a number of railroads have begun in a small way to use alloy steel springs, principally chrome-vanadium steel, on locomotives, and are obtaining excellent results in the elimination of failures. During the past four or five years there has been a growing interest on the part of the railroads, in the possibility of securing better helical springs for bolster trucks, particularly for 70-ton freight cars. A greater reserve movement is desirable which means an increase in fiber stress.

It is apparent such springs must be made of an alloy steel, for carbon spring steel cannot produce the requisite high torsional elastic limit combined with the necessary toughness. A number of alloy steels have been tried out from time to time and a promising one recently developed, is a medium silicon-vanadium steel. This steel differs from the standard carbon spring steel only by the addition of 0.50 to 0.75 per cent silicon and 0.15 to 0.20 per cent vanadium. Like any other steel it should be properly heat treated to develop its maximum qualities. There are now in successful operation about 8000 springs of this steel designed for a maximum fiber stress of 110,000 lb. as against the usual 80,000 lb. fiber stress for carbon steel springs, and there is a corresponding difference in the torsional elastic limits of the two types of these steels.

Several railroad spring shops are now prepared to properly heat treat a small production of alloy steel springs, and it is reasonable to suppose that, with the growing demand for better springs, they will eventually adapt the production methods of the automotive spring manufacturers to their requirements, and subject their product to closely controlled heat treatment.

Magnetic Analysis—*New Art and Science Being Founded*

BY A. V. DE FOREST

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HOW good is a piece of steel? "Take it to the laboratory and test it," says the devotee of science, if ever he reaches such a position of authority. "Try it and see," says the old practical hand. Which is right, and how does he obtain the information necessary to answer the question?

Probably as a punishment for the sin of looking down on the practical man from the heights of learning, the laboratory scientist has to spend a great deal of time with chemical analysis, microscopic examination, routine mechanical tests of tensile strength, elongation, reduction in area, hardness—perhaps even fatigue limits or impact values. At the end of all this an impressive report is gathered together, with photomicrographs attached.

How good is the piece of steel as shown in this report? The answer is valid only if another report covering the same factors on a similar piece of steel, similarly made and similarly treated, has been used for the particular duty for which the sample was intended in the first place. In other words, if the sample is like one which has given good service, it is likely to be good; if different, unless the same difference has been tried, it may be better or it may be worse. It may be harder and wear longer, but break from being too brittle; or it may be softer and weaker, but so tough it threatens to last forever. "Try it and see," if the trying has not been done and the result noted in the great sum of practical experience which composes our knowledge of steel making and treating.

Why then, if all is comparison, should we not devise a test which will tell at once whether one piece of steel is like another in composition, grain structure and mechanical properties? The ferromagnetic investigators have long told us that all the known, and probably the unknown factors as well, which influence the mechanical behavior of steel are reflected in the magnetic behavior. How are they getting on with this pleasant-sounding proposition? The hitch has always been that, as in chemical analysis, where a small quantity of one element may be significant while a large quantity of another may not be, there has heretofore been no way to properly distribute the emphasis among the many magnetic characteristics.

Now at last it appears from publications by members of the committee for magnetic analysis of the American Society for Testing Materials that methods are being devised which can be made to indicate at a glance, not only whether one piece of steel is exactly like another, but also in what respect it is different, provided it is not too different. The ideal case is one in which conclusive working tests can be carried out, and the magnetic measurements made afterward. Usually, however, the testing process is destructive and magnetic analysis must be made of specimens embodying all the changes which are likely to occur, and these in turn tested out in practice—a long job, but the solution provides a very cheap and rapid method of control.

One company has operated a magnetic inspection for five years. Several others are in routine operation, and a number more are in the laboratory stage of trying and seeing. Unquestionably the time is coming when it will be as easy to tell whether one piece is like another in its mechanical behavior as it is now to measure its similarity in size and finish.

Just as accumulated evidence is the basis of judgment in respect to chemical and microscopic analysis, the experience of many individuals in scattered fields is building an art and founding a science of magnetic analysis.

Salt Baths—*Growing Use as a Heat-Treating Medium*

BY SAM TOUR

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SOME five years ago the writer began public discussion of that little understood subject, "Salt Baths for Heat Treating." Various mixtures were described, their compositions and properties given, and the need for proper furnaces and proper containers was gone into in considerable detail. Prior to this time there were but few companies selling salt bath mixtures other than cyanides. Since then many have entered the field, some are still in it and some have dropped out. Also during this time many heat treaters have attempted to make up their own salt bath mixtures. Some have succeeded while many have encountered no end of trouble. Difficulties seem to have been due largely to two things, improper composition of mixtures and improper furnaces.

Several years ago the writer pointed out that mixtures containing carbonates, and straight chloride mixtures after being in use for some time will cause decarburization. Yet in spite of this well known fact numerous mixtures of this kind are on the market and fabulous claims made for them. There are cases of course where apparently mixtures of this kind are working satisfactorily for treating high-carbon steel where surface decarburization must not take place, but these cases are rare.

To take a sample of a successful mixture being used in some plant, send it to a laboratory for an

welding rods that will give an ultimate tensile strength of much over 60,000 lb. per sq. in., and it is entirely possible to make welds of 120,000 lb. ultimate strength, with 10 per cent elongation in 2 in. over the weld, using special materials.

The foregoing refers to welds not heat treated. Welds made with low-carbon wire obviously cannot have their tensile strength increased by heat treatment, though their ductility may be made greater, always provided that they are clean and free from oxides and other non-metallic impurities. However, it should be remembered that a clean weld has the same Young's modulus of elasticity as any other steel, so that, with proper design and good execution, the strain within the elastic limit is the same in both weld and base metals.

As fusion welding is studied and its applications increased, it will be increasingly necessary to pay more attention to heat treatment, and quite a little work has been done experimentally in special cases with satisfactory results. The principal difficulty is that the critical points of weld metal, and the time needed for changes to occur, are not the same as for the base metal, so the heat treatment is liable to be complicated and expensive.

But there is every reason to believe that, as the demand for superior welds increases, the applications of heat treatment to welds will also increase, just as other heat treatments have been developed to meet demands for increased physical properties required for severer service conditions.

Steel Springs—Only Alloy Steels, Heat-Treated, Meet Needs

BY G. L. NORRIS

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IN developments in the heat treatment and use of alloy steels for springs, the field may be roughly divided into two large groups: Automotive and railroad springs. It is recognized that there are immense quantities of springs used in other lines, some of them subjected to highly refined heat-treating methods, as for example clock and watch springs. In automotive and railroad springs we find a great contrast in the methods of manufacture, particularly in the use of alloy steels and the methods of heat treatment.

The automotive industry, with an annual production now of approximately 4,000,000 cars, buses and trucks, requires the mass production of hundreds of thousands, and even millions of springs of identical dimensions. These must all be of high uniform quality to ensure comfortable riding and safety and to protect the vehicle from damage from road shocks. For the motor vehicles produced in 1926, there were required over 15,000,000 chassis springs, and in addition many thousands of springs were required for repairs. The production of these immense quantities of springs has resulted in the development of a highly specialized and technically controlled industry.

It was soon realized in the early stages of the industry that only by the use of alloy steel, properly heat-treated, could the necessary combination be obtained of high elastic limit, toughness, resiliency and fatigue resistance. Over 90 per cent of the automobile chassis springs produced in this country are of alloy steel, and made in plants equipped with automatic continuous heating furnaces with elaborate pyrometric control, and automatic shaping and quenching machines.

The alloy steels used for chassis springs are, with hardly an exception, chrome-vanadium, chrome, or silico-manganese steels, and of these by far the greater tonnage is of chrome-vanadium, which through many years has demonstrated its surpassing value by the ease and economy with which the requisite high quality can be uniformly attained in mass production.

Developments in heat treating in the automotive spring industry will be principally in the way of minor mechanical improvements in the furnaces, the use of electricity for heating and refinements in pyrometric control.

In the production of railroad springs there is practically no mass production, the nearest approach being coil springs for freight car trucks and draft gears. Automatic heating furnaces and pyrometric control are noticeably absent. The average annual production of railroad equipment for the past 15 years has been: Freight cars, 114,890; passenger cars, 1693; and locomotives, 3313. Since 1918 the production has been much less.

Practically all the railroad car and locomotive springs are made of carbon steel of a standard composition that has been in use for 40 years or more, and by shop methods that have been but little changed for a like period. The railroad spring shops, largely because of the absence of mass production, lack the automatic heating furnace equipment and elaborate pyrometric control of the automotive spring shops.

The railroad spring problem principally concerns the protection of the equipment and roadbed. With the increasing weight and capacity and cost of locomotives and cars, the need and economy of better springs is becoming more apparent, and the railroads are slowly beginning to realize that they can afford to pay more for better springs for the protection of their equipment. Until recently these conditions were met by increasing the number or size of the springs with no change in quality. This procedure has not been successful.

Within the past two or three years, quite a number of railroads have begun in a small way to use alloy steel springs, principally chrome-vanadium steel, on locomotives, and are obtaining excellent results in the elimination of failures. During the past four or five years there has been a growing interest on the part of the railroads, in the possibility of securing better helical springs for bolster trucks, particularly for 70-ton freight cars. A greater reserve movement is desirable which means an increase in fiber stress.

It is apparent such springs must be made of an alloy steel, for carbon spring steel cannot produce the requisite high torsional elastic limit combined with the necessary toughness. A number of alloy steels have been tried out from time to time and a promising one recently developed, is a medium silicon-vanadium steel. This steel differs from the standard carbon spring steel only by the addition of 0.50 to 0.75 per cent silicon and 0.15 to 0.20 per cent vanadium. Like any other steel it should be properly heat treated to develop its maximum qualities. There are now in successful operation about 8000 springs of this steel designed for a maximum fiber stress of 110,000 lb. as against the usual 80,000 lb. fiber stress for carbon steel springs, and there is a corresponding difference in the torsional elastic limits of the two types of these steels.

Several railroad spring shops are now prepared to properly heat treat a small production of alloy steel springs, and it is reasonable to suppose that, with the growing demand for better springs, they will eventually adapt the production methods of the automotive spring manufacturers to their requirements, and subject their product to closely controlled heat treatment.

Magnetic Analysis—New Art and Science Being Founded

BY A. V. DE FOREST

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HOW good is a piece of steel? "Take it to the laboratory and test it," says the devotee of science, if ever he reaches such a position of authority. "Try it and see," says the old practical hand. Which is right, and how does he obtain the information necessary to answer the question?

Probably as a punishment for the sin of looking down on the practical man from the heights of learning, the laboratory scientist has to spend a great deal of time with chemical analysis, microscopic examination, routine mechanical tests of tensile strength, elongation, reduction in area, hardness—perhaps even fatigue limits or impact values. At the end of all this an impressive report is gathered together, with photomicrographs attached.

How good is the piece of steel as shown in this report? The answer is valid only if another report covering the same factors on a similar piece of steel, similarly made and similarly treated, has been used for the particular duty for which the sample was intended in the first place. In other words, if the sample is like one which has given good service, it is likely to be good; if different, unless the same difference has been tried, it may be better or it may be worse. It may be harder and wear longer, but break from being too brittle; or it may be softer and weaker, but so tough it threatens to last forever. "Try it and see," if the trying has not been done and the result noted in the great sum of practical experience which composes our knowledge of steel making and treating.

Why then, if all is comparison, should we not devise a test which will tell at once whether one piece of steel is like another in composition, grain structure and mechanical properties? The ferromagnetic investigators have long told us that all the known, and probably the unknown factors as well, which influence the mechanical behavior of steel are reflected in the magnetic behavior. How are they getting on with this pleasant-sounding proposition? The hitch has always been that, as in chemical analysis, where a small quantity of one element may be significant while a large quantity of another may not be, there has heretofore been no way to properly distribute the emphasis among the many magnetic characteristics.

Now at last it appears from publications by members of the committee for magnetic analysis of the American Society for Testing Materials that methods are being devised which can be made to indicate at a glance, not only whether one piece of steel is exactly like another, but also in what respect it is different, provided it is not too different. The ideal case is one in which conclusive working tests can be carried out, and the magnetic measurements made afterward. Usually, however, the testing process is destructive and magnetic analysis must be made of specimens embodying all the changes which are likely to occur, and these in turn tested out in practice—a long job, but the solution provides a very cheap and rapid method of control.

One company has operated a magnetic inspection for five years. Several others are in routine operation, and a number more are in the laboratory stage of trying and seeing. Unquestionably the time is coming when it will be as easy to tell whether one piece is like another in its mechanical behavior as it is now to measure its similarity in size and finish.

Just as accumulated evidence is the basis of judgment in respect to chemical and microscopic analysis, the experience of many individuals in scattered fields is building an art and founding a science of magnetic analysis.

Salt Baths—Growing Use as a Heat-Treating Medium

BY SAM TOUR

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SOME five years ago the writer began public discussion of that little understood subject, "Salt Baths for Heat Treating." Various mixtures were described, their compositions and properties given, and the need for proper furnaces and proper containers was gone into in considerable detail. Prior to this time there were but few companies selling salt bath mixtures other than cyanides. Since then many have entered the field, some are still in it and some have dropped out. Also during this time many heat treaters have attempted to make up their own salt bath mixtures. Some have succeeded while many have encountered no end of trouble. Difficulties seem to have been due largely to two things, improper composition of mixtures and improper furnaces.

Several years ago the writer pointed out that mixtures containing carbonates, and straight chloride mixtures after being in use for some time will cause decarburization. Yet in spite of this well known fact numerous mixtures of this kind are on the market and fabulous claims made for them. There are cases of course where apparently mixtures of this kind are working satisfactorily for treating high-carbon steel where surface decarburization must not take place, but these cases are rare.

To take a sample of a successful mixture being used in some plant, send it to a laboratory for an

analysis, purchase commercial salts on the market and mix them to reproduce this analysis, and proceed to market this mixture is a simple procedure. It is to be regretted that many of the mixtures on the market have originated in this way and are thus not the result of any original research work or study of the subject. Sad experience usually comes to the consumer who buys some of this supposedly perfected product; in the mean time the salt bath process of heat treating falls into disrepute. The future of salt baths lies largely with the companies who are selling them.

For several years the writer has insisted on the need of proper furnaces for salt baths. Many of the principles which he gave for furnace designs have been tried out by individual plants and a number of prominent furnace builders have begun to build furnaces accordingly. As far as known, these furnaces have been meeting with success. In 1925 the writer made the following statement:

> The salt salesman who advises the prospective user of salt that any kind of a pot furnace will serve his requirements not only retards the promotion of properly designed furnaces for the work, but also retards the use of salts for heat-treating work.

This same statement applies today even more than it did then.

During the last few years the use of salt baths for tempering steel in the range from 350 to 1000 deg. Fahr. has been adopted to the extent that over 25 tons of this type of salts are being sold per month. The volume is rapidly growing. During the same period, attempts to use salt baths for annealing high-carbon steel wire in coils, for continuous heat treating high-carbon steel wire, and for heat treating oil hardening nonchanging tool steels have met with failure or only indifferent success. On the contrary the use of salt baths for the annealing of low-carbon steel wire in coils has proved satisfactory and the practice is rapidly growing. Also the use of salt baths containing a percentage of cyanide for the heat treating of alloy steel gears has shown such advantages that thousands are being so treated every day. It has been found that, by using salt baths containing cyanide and quenching in brine solutions, soft spots in carburized "abnormal" steels can be eliminated and this practice is being followed in many plants.

It is not to be expected that salt baths will entirely displace other methods of heat treating but as time goes on and we all become better acquainted with salt baths and what they can do and cannot do, their application in the heat-treating room will become broader and broader. A salt bath or two will then be considered as a necessity in even the smallest tool hardening shop or heat-treating room.

X-Rays—Wider Interpretative Use of This New Art

BY DR. ANCEL ST. JOHN

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A LARGE increase of interest in the technical uses of X-rays has developed in the past year. This is due not so much to the publication of reports of outstanding investigations as to the large amount of missionary effort among the pioneers in the use of X-ray methods. To the voices already crying in the wilderness have been added those of Clark and his associates at the Massachusetts Institute of Technology and the very active group at the Woolwich Arsenal in England.

To the miscellaneous propagandist articles appearing from time to time in the technical and trade journals, there have been added two valuable books: "Applied X-rays" and "X-rays: Past and Present." These present a wealth of examples of the problems which have been treated successfully by X-ray methods and show beyond any reasonable doubt that the new tool must be considered seriously for all branches of industry.

Other factors contributing to this increase of interest have been the X-ray exhibit at the steel exposition of the steel treaters in Chicago last year, the Marburg Lecture of the American Society for Testing Materials in June this year and the two conferences on "X-rays in Industry" at the newly-organized Institute of Chemistry, held this year at State College, Pa., in July. Like the books, all of these have been directed to arousing public interest rather than to presenting new discoveries. In a sense they are all "old

stuff." But they are old stuff presented in a new way to new ears and new eyes, and for those ears and eyes they are "new stuff." As a result eyes, which opened wide with astonishment, are now seeing with intelligence and ears that were deaf are now listening for more good news.

Few articles representing original investigations of importance to the steel industry have appeared during the year. The few that have been presented for the most part support accepted theories concerning the structures associated with various heat treatments of steels. In this category fall the investigations of Dowdell and Harder, reported at the 1926 convention of the American Society for Steel Treating and printed in the *Transactions*, and those of St. John on "High-Speed Steel," reported at the 1927 convention of the American Society for Testing Materials but not yet printed.

It is known that other important investigations are in progress but not yet ready for publication. Doctor Davey, in the X-ray laboratories at Penn State, has an ambitious program on pure binary alloys. Elsewhere valuable contributions to the knowledge of alloy steels is being accumulated. These should be continued and published so that eventually X-ray diagrams of all the important alloys are available.

Other investigations have been directed toward improving the technique and in particular toward increasing the ease and reducing the time of X-ray tests. A paper describing some developments in this direction has been announced for the approaching convention of the American Society for Steel Treating.

The present trend in applied X-rays is to try them out for all new problems and for the old ones where customary methods are insufficient. As the methods, whether for radiography or for diffraction analysis, are made more rapid and convenient, it may be expected that these trials will show not only that X-ray methods are competent to handle the problem but also that they can do so easily and economically.

The heat treatment of metals, since it involves rearrangement of the atoms due to what may be termed solid ch mical or physical reactions, is one of the fields in

which X-ray diffraction analysis is of special importance. As the results of investigations now in progress or projected are made public, we may expect a wealth of information as to the fundamental reasons for the known phenomena of heat treatment. We are even justified in hoping that the time will come when we can, in the words of Doctor Davey, "write a prescription for an alloy."

Tool Steels—New Types and Heat Treatments Probable

BY J. P. GILL

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RECENT progress and development in the heat treatment of tool steels has been toward the obtaining of greater uniformity rather than innovations of basic practice. Hundreds of large and small manufacturers are appreciating as never before the value of good heat-treating equipment. This has resulted in the wider application of temperature measuring and control devices; in the increased use of electricity for heat; in closer control and inspection through the use of the microscope and physical testing apparatus; and the wider use of equipment developed to minimize the human factor, such as the "hump" and the "volcrit" methods (based respectively on the change of the rate of heat absorption and the change of the rate of expansion as the steel being treated passes through the critical range).

During the last several years there has been a much wider application of salt baths for heating for both hardening and drawing carbon and alloy tool steels; but the use of salt baths for heating for hardening high-speed steels is probably less than it was two or three years ago.

Oil and water remain supreme as quenching mediums. However, the United States Bureau of Standards in its thorough investigation into the cause of soft spots of water-quenched carbon tool steel and carburized steel, found that practically all tap water is highly aerated which is the direct cause of soft spots in such steels in many instances. Merely boiling the water removes this difficulty.

At present there is a tendency to lengthen the time of draw of all types of tool steels but particularly of high-speed steel. Where many manufacturers were using a draw of one hour duration for high-speed steel, they are now using three and four hours and in some instances even longer.

Heat-treating methods which will produce a tool with an intensely hard surface, preferably with a tough core, are being sought. The Krupp nitrifying process obtains this on specific types of steel. By placing the steel in contact with nitrogen laden gases at comparatively low temperatures for a long period of time an intensely hard but very shallow case is produced. The hardness of the case is said to correspond to a Brinell hardness of from 900 to 1000. The thinness of the case and other characteristics has prevented a wider use of the process for tools.

To impart an intensely hard surface to high-speed steel, a few users after hardening and drawing the steel in the regular manner now immerse it in a bath of cyanide at 1100 deg. Fahr. for 10 to 15 minutes. Such a treatment is said to impart the desired surface without unduly embrittling the steel.

The last year has witnessed the increased application of high-carbon high-chromium steels, containing approximately 2 per cent carbon and from 12 to 14 per cent chromium; consequently, heat treatments for steels of this type have been commercialized. Not new, but not before widely advocated for such steels, has been the "austenization" treatment, which consists of hardening the steels from a high temperature, usually near 2100 deg. Fahr. to produce austenite and grain refinement, and then rehardening from a lower temperature, usually about 1750 deg. Fahr.

Since uniformity in the physical properties of tools which are determined by heat treatment is near attainment, it is to be expected that notable future progress will involve changes in basic procedure This may mean the development of new and different types of steels which will react to radically different treatments. That such may come about in the not distant years seems to be fore-shadowed by such treatments as the Krupp nitrifying process.

Aluminum Alloys—Greatly Strengthened by Heat Treatment

BY R. S. ARCHER

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TO those not especially familiar with the subject, it may be surprising to learn the extent to which the properties of aluminum alloys may be altered by heat treatment.

It is common to regard the hardening of steel by heat treatment as a unique phenomenon. Pure iron has a Brinell hardness of approximately 75. By the addition of carbon with or without the common alloying elements, steel may be produced whose hardness can be raised to perhaps 750 by heat treatment. The combination of alloying and heat treatment has thus given a product with a hardness about ten times that of the pure iron.

Pure aluminum (99.95 per cent) has a Brinell hardness of about 15. Light aluminum alloys can be produced which can be mechanically worked and which can be heat treated to a Brinell hardness of approximately 150. The increase is again about ten to one. Considering the possibilities of heat treatment alone, it may be mentioned that an alloy of the aluminum-magnesium-silicon type may be annealed to a Brinell hardness of about 28 and hardened to a Brinell hardness of about 120. This change compares closely with the increase in hardness of annealed tool steel by hardening.

The development of the common duralumin type of alloy (aluminum - copper - magnesium) some 15 years ago has been followed by the development of other

types of high strength aluminum alloys of which the following may be mentioned:

Aluminum-copper-manganese-silicon, (known as 25S).

Aluminum - copper - silicon, (Lautal).

Aluminum-magnesium-silicon, (51S).

Aluminum - copper - magnesium-silicon-manganese, (Special 17S, or "superduralumin").

Aluminum - zinc - magnesium, (Constructal).

Aluminum - zinc-copper-magnesium, ("E" alloy, National Physical Laboratory, England).

Aluminum - copper - nickel - magnesium, ("Y" alloy, National Physical Laboratory, England).

These various alloys, and some others which have not been mentioned, show after heat treatment physical properties covering a fairly wide range with tensile strengths from about 35,000 to 88,000 lb. per sq. in. and elongations from about 10 to 30 per cent. The alloys which are at present most generally used for structural purposes develop a strength of about 60,000 lb. per sq. in. with an elongation of about 18 per cent. Some of the heat-treated products may be further hardened by cold working, with reduced ductility, of course.

The various alloys, even when possessing approximately the same tensile properties, may show certain differences in other properties which are important from the standpoint of either use or fabrication. Many alloy steels are used which give approximately the same hardness and tensile properties but which differ materially as to ease of rolling, forging, machining, or heat treating.

The very recent and present tendency is in the development of fabricating processes rather than the development of more types of alloy. Much progress has been made in reducing to a production basis the manufacture of various wrought forms such as rod, tubing, sheet, forgings, and screw machine products. A rather striking achievement in the forging art is the production of the forged crank cases used on the new Pratt & Whitney aircraft engines. The development of the forged aluminum alloy aircraft propeller is also a notable accomplishment both from the standpoint of fabrication and design. These propellers are rapidly becoming popular—it was with one of them that Lindbergh made his recent flight to Paris.

The materials just referred to are all wrought products. When it is desired to obtain maximum physical properties in castings, it is found that somewhat different alloy compositions and different heat-treating processes give better results than those used for the wrought alloys.

Within the last few years the heat treatment of aluminum alloy castings has grown from a laboratory basis to a commercial production of some magnitude. The problems of heat treating and quenching complicated castings have been worked out, and it is now possible to heat treat practically any type of casting.

The heat-treated castings do not develop as good physical properties as the heat-treated wrought alloys. Various combinations of strength and elongation are obtained from about 32,000 lb. per sq. in. with 8 per cent elongation to about 45,000 lb. per sq. in. with 1 per cent elongation. These are average values rather than specification figures. Castings may also be heat treated to increase their hardness as in the case of aluminum alloy pistons.

The marked modern tendency to save weight in all forms of transportation equipment points to a rapid increase in the use of the heat-treated aluminum products.

Aluminum Bronze and Copper Alloys—Improved by Heat Treatment

BY W. M. CORSE

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IT is not beyond the bounds of possibility that the ancient myth of hardened copper will ere long be dispelled. New schemes and processes are being put forth every year, and only recently metallurgists have discovered that heat treatment of copper alloys of high copper content—from 80 to 90 per cent—results in a very definite increase in Brinell hardness and tensile strength.

The term "bronze" strictly applied, means a copper-tin alloy, but in rolled products it is frequently used to designate any alloy of copper with such other elements as aluminum and tin wherein the copper content runs over 80 per cent.

An instance is aluminum bronze, an alloy studied by Comstock, Strauss and the writer, whose composition runs 84 to 90 per cent copper, the remainder being mainly aluminum with varying small percentages of iron, manganese or nickel. When the aluminum content is above 8 per cent the alloy can be heat treated in the same manner as steel with correspondingly advantageous results. The higher the aluminum content up to 15 per cent—the practical upper limit—the more pronounced are the benefits of heat treatment.

Ten per cent aluminum bronze subjected to heat treatment is a counterpart, except for color and composition, of a good 0.35 per cent carbon steel. This fact gives a picture of the advantageous effect of heat treatment on aluminum bronze and the future possibilities of the alloy. The American Society for Testing Materials has a specification on the heat-treated aluminum bronze which furnishes further information to the engineer.

Before heat treatment, such an alloy will have a tensile strength of about 70,000 lb. per sq. in., an elongation of 20 per cent, with a Brinell hardness number of 100. After heat treatment by simple quenching, the strength is almost 100,000 lb. per sq. in. with an elongation of 1 per cent and hardness of 240.

After quenching and reheating, with subsequent cooling, the tensile strength is about 90,000 lb. per sq. in. and elongation about 13 per cent with a hardness number of 140.

Many of the vital details in connection with the application of heat treatment to cast bronzes have only been developed to this modern perfection within the past few months.

Heat treatment, however, will not be the only agency tending toward the rediscovery of the "lost art of hardening copper." Recent experiments have shown that certain hardening agents have very beneficial effects. The discovery of magnesium silicide, the hardening agent of duralumin, pointed the way to success with other metals. Copper containing nickel silicide as a hardening agent is shown to have remarkable properties in a long series of experiments by Corson at the Union Carbide & Carbon Research Laboratories. This alloy had been subjected to a heat treatment analogous to that used for duralumin, and a marked im-

provement in the properties resulted.

It is entirely probable that a hardener like that already found for aluminum and for copper will be found in the near future for other non-ferrous metals, and it is not too much to hope that all non-ferrous alloys may some day be successfully heat treated. We can, therefore, pay deserved tribute to the metallurgist for his accomplishments in the heat treatment of copper and bronze, and wish for him best success in the future.

Gas as a Fuel—Expanding Use in Annealing Sheet and Wire

BY F. W. MANKER

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IT is essential to differentiate between heating operations as such, and heating operations for controlling the physical and metallurgical properties of a product or heat treating. Experience has shown that, for purely heating operations, competition is based in nearly every instance directly upon the relative unit costs of heat energy at the time and place. In heat-treating operations, however, many factors must be considered in the selection of a fuel and it is this problem of determining the relative importance of the various factors, and how each particular fuel affects these factors that have made the question so difficult.

In the current year outstanding advances have been made in furnace engineering. It has been fairly well demonstrated, over a broad range of heat-treating operations in the steel and allied industries, that clean cold gas plus correct furnace engineering, will produce results from the standpoint of quality product, labor for operation and equipment maintenance, that compare favorably with the best results to be obtained with any other fuel. Some of the most striking examples are to be found in the steel industry.

Competition for automotive sheets, and for full finished sheets having deep-drawing and extra deep-drawing qualities, is continually increasing. As a result, manufacturers have been forced to cut prices and improve manufacturing processes. The development of the continuous normalizing furnace has logically followed in the wake of these conditions. The requirements for a satisfactory normalizing furnace are:

1.—Definite automatic control of atmosphere in heating and cooling zones of furnace.
2.—Method for handling single sheets from charging to discharging end of furnace.
3.—Automatic control of rate of heating.
4.—Automatic control of rate of cooling.

The process consists of bringing the sheet up to a high temperature, cooling to a dull red in the furnace and cooling chamber, roller leveling as it leaves the cooling chamber and piling from the roller leveler. In the past five years, furnaces for this operation have been built to use powdered coal, oil, electricity, hot producer gas, and clean coal gas, but with intervening years the leading producers have tended more and more to gas-fired normalizing furnaces using clean gas.

Another instance may be drawn from the wire industry, which is generally accepting the gas-fired patenting furnace as the most satisfactory combination to produce their product at lowest cost. The requirements for this operation are automatic control of atmosphere in the furnace and temperature distribution. Both factors affect the uniformity of the product as well as the surface condition.

Advances have also been made in another highly competitive field, namely, in the melting of soft metals for both heat treatment and galvanizing. This has been due to the ability to secure longer pot life and more accurate control of the temperature of the bath with gas fuel.

The gas-fired furnace, equipped with automatic proportioning burner and automatic temperature control, has made good progress for such operations as carbonizing, hardening, drawing and annealing in automotive building and parts manufacturing. This progress has been based upon the ability to give uniform product, automatic control of temperature, and eliminate labor and maintenance.

Electricity for Heat—Wide Application in Treating Metals

BY F. W. BROOKE

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ELECTRICITY lends itself to simple and accurate control and its relative cost has been taken care of by the high standard of insulation and engineering now employed. The greatest impetus was given to electric heat treating in 1917 when the first large industrial furnace, employing metallic heating units, was put into use for the heat treating of guns. Since that time its progress has been one of the outstanding features of the furnace and heat treating industry.

The automobile manufacturer probably deserves the greatest credit among users for advances made in the use of electric heat-treating furnaces. The necessity of keeping down the weight of the various parts, increasing the strength especially to resist shock, called for the greatest degree of accuracy in heat treatment. Duplication of parts and quantity production made the use of more complicated conveying mechanism more economical and attractive. It was the electric furnace that stepped in at the opportune time to meet these requirements. Today the application of electric furnaces on a large scale has spread throughout the automobile industry, steel mills, iron and steel foundries, non-ferrous mills and manufacturing units, enamelling and a large range of special applications.

In the steel mills the electric furnace has been particularly successful in the annealing of tool and alloy steel bars and the ever closer Brinell limits are being met 100 per cent when reasonable

care is given to mill finishing temperatures. The increasing use of the four-high mill in the sheet industry calls for the finest quality of rolls and the problem of roll breakage is now being met by a leading mill manufacturer by the accurate electric heat-treating of alloy steel rolls.

The annealing of electric sheets in order to obtain better uniformity and a better magnetic permeability is now being carried out to an increasing extent in electric furnaces and in a good many cases under a gaseous atmosphere, such as hydrogen. After the sheets are stamped for transformer and motor parts, they are usually re-annealed in electric furnaces. The sheet manufacturer also maintains his rolls at a uniform working temperature in a special electric furnace so that the replacing roll will start out under the most favorable condition for the mill and its products.

In the steel foundries the annealing of castings gives a new degree of uniformity and a decided cutting down in the amount of scaling. This latter feature alone, in the case of small intricate castings when sold by the pound, is a decided economy. One large manufacturer of dredges and shovels is about to start up a true heat-treating department for steel castings, in which all the furnaces will be electric. This progress of scientifically treated alloy steel castings will be unique and a real step in engineering.

Some work has been done in the normalizing of intricate gray iron castings and its application will undoubtedly increase. The ageing of gray iron castings can be successfully carried out by such accurate heat treatment as can be obtained in electric furnaces.

In the metal industries, other than iron and steel, the most important application of the electric furnace has been in the aluminum industry where a fine degree of accuracy in a small temperature range is very essential. Brass, copper and nickel industries are also finding increasing uses for the electric furnace, particularly for bright annealing in either water-sealed furnaces or under special atmospheres.

The outstanding need of the electric furnace industry today is the development of a heating unit that will bring the electric furnace into the higher range of temperatures, particularly the forging temperatures from 1900 to 2300 deg. Fahr. The automobile industry once more is leading the field and considerable amount of development work has been done and furnaces have been installed and are operating for heating steels to forging temperatures.

The non-metallic type of heating unit appears to offer the best solution at the present time although a considerable amount of difficulty has been experienced in obtaining and maintaining cool terminals.

For temperature applications of 1800 deg. Fahr. and less, the use of metallic heating units, either the ribbon, rod or casting type, is now universal and the early fears for the life of such heating units have been dissipated. Where the design and application have been taken care of by properly experienced engineers, the life of the metallic heating unit in this temperature range is practically indefinite. Failures can now be invariably traced to lack of proper design and application or rare cases of mechanical abuse.

Exhibits Embrace All Lines of Metalworking and Treating Equipment

MATCHING in comprehensiveness and in some ways excelling past expositions, the 1927 National Steel and Machine Tool Exposition of the American Society for Steel Treating at Detroit the week of Sept. 19 will include equipment and supplies for all phases of the arts of working, welding and heat treating of metals. Many new products will be shown, some of which are illustrated and briefly described on subsequent pages. A feature of this year's show is the number of welding machines exhibited. On the following pages will be found references to all of the companies exhibiting, together with the numbers of their booths, products to be shown and names of representatives attending. Another feature of interest in this section is an array of portraits of the officers of the local chapters and groups of the American Society for Steel Treating who are now holding office.

Abrasive Co., Philadelphia. Booth 375.
Grinding wheels and abrasives. In attendance: W. A. MacFarland, I. R. Blair, A. J. Lewis, W. A. McMillan.

Acme Electric Welder Co., Huntington Park, Cal. Booth 151A.
Acme electric spot welding machines, samples of welded products; butt welder. In attendance: W. L. B. Cushing, A. V. B. Cutler, George M. Hessdoerfer.

Acme Stamp Co., Detroit. Booth 353.
Line of marking dies and devices and marking machines. In attendance: W. F. Forrester, Emory Hendrickson, V. E. Sorge, Don E. Forrester.

Ajax Mfg. Co., Cleveland. Booth 221.
See illustration on page 638. In attendance: Gordon G. Fristoe, W. W. Criley, A. L. Guilford.

Allegheny Steel Co., Brackenridge, Pa. Booth 473.
Ascoloy, a corrosion resisting alloy; products made of Ascoloy. In attendance: C. B. Collomon, O. M. Otte, H. N. Arbuthnot, R. L. Perso.

American Brass Co., Waterbury, Conn. Booth 146.
A complete line of Anaconda copper alloy welding rods. In attendance: A. M. Dinkler, W. C. Swift, W. H. Dowd, M. B. Allen, H. G. Wallis.

American Car & Foundry Co., New York. Booth 156.
One No. 3, 3-electrode Berwick electric rivet heater for heating rivets 5/8 in. to 1 1/8 in. in diameter and of any length up to 7 3/4 in.; and a No. 3, 1-electrode type E Berwick electric heater for heating ends of rods, or on given portions along the length of the rod. In attendance: F. C. Cheston and Harold C. Cheston.

American Electric Fusion Corporation, Chicago. Booth 176.
One A. E. F. type L. D. 8 automatic spot welder with capacity of 2 pieces of 1/8 in. stock. One A. E. F. type P. D. 16 production duty type welder, welding capacity two pieces 1/4 in. stock. One A. E. F. portable spot welder, capacity two pieces 1/16 in. stock. In attendance: Edmund J. Henke, G. A. Fuhrmark, B. Scherndahl.

American Gas Furnace Co., Elizabeth, N. J. Booth North Woodward Annex.
See illustration on page 639. In attendance: P. C. Osterman, John Mehrman, Gustav Schwab, T. Farwick, Sr., Elmer C. Cook, S. C. Dinsmore, William J. Barenscheer.

American Hoist & Derrick Co., St. Paul, Minn. Booth 162.
See illustration on page 622. In attendance: W. K. Garvin and P. J. Kiwus.

American Lanolin Corporation, Lawrence, Mass. Booth 421.
Small pieces of steel in both bright and pickled finish protected with water soluble rust proofing compound, Paralan; parts covered with Rustop, a heavy rust proofing material. In attendance: James Baillie, J. B. Pollard, L. L. Roquet, J. O. Nesser.

American Metallurgical Corporation, Boston. Booth 139.
See illustration on page 634. In attendance: K. A. Juthe, S. N. Juthe, H. A. Hanson, J. C. Juthe, W. H. Ogden, E. E. Bolds, G. F. McGill.

American Resistor Corporation, Milwaukee. Booth 137.
Globar element equipped furnace, operating at forging temperature, the Globar element fully visible and showing details of terminal construction using Globar element 28 in. x 1 1/4 in., 110 volts, 110 amperes; Globar element, 90 in. long x 3 in. diameter, 220 volts, 60 kw. in one unit; Globar element, 72 in. long x 3 in. diameter, 220 volts, 48 kw in one unit; Globar element 2 3/4 in. long x 5/16 in. diameter, 150 watts; several domestic appliances equipped with Globar elements. In attendance: Joseph A. Steinmetz, W. E. Duersten, B. G. Tarkington, Oscar Brophy, S. Perkins, Arnold Pfau, Jr.

American Spring & Mfg. Corporation, Holly, Mich. Booth 302.
Extension and compression springs; torsion springs from

Detroit Chapter

E. J. Hergenroether,
Cadillac Motor Car Co., Chairman

F. P. Zimmerli,
Barnes-Gibson-Raymond, Inc., Vice-Chairman

J. G. Gagnon,
Hudson Motor Car Co., Secretary-Treasurer

0.008 in. diameter stock up to and including 5/16 in. diameter stock; flat springs and wire forms, metal stampings; special exhibit of springs used in the automotive industry. In attendance: E. A. Hartz, J. A. Cox, E. E. Hartz.

American Stainless Steel Co., Pittsburgh. Booth 421.
Manufactured articles representing applications of stainless steel, such as a gas heating stove and mantel, gas water heater unit, tubes of various sizes and finishes, chemical and oil refinery equipment, garage heater, automobile parts. In attendance: J. C. C. Holding and C. S. Bunting.

THE IRON AGE IN BOOTH NO. 414.

THE IRON AGE editorial and advertising representatives will be found in booth No. 414 at the Exposition of the American Society for Steel Treating in Detroit. Current issues of the paper and reprints of this section of the Sept. 8 issue will be available.

American Gas Association, New York. North Woodward Annex.
Latest developments in gas-fired heat-treating furnaces. Companies cooperating with the American Gas Association, American Gas Furnace Co., the Eclipse Fuel Engineering Co., E. Leitz, Inc.; Stillwater Mfg. Co., Sullivan Machinery Co., Surface Combustion Co., Wilson Maeulen Co., and C. M. Kemp Mfg. Co. In attendance: D. W. Chapman, R. G. Guthrie, H. A. Clark, A. M. Apman, J. S. Comstock, F. H. Andrews, H. F. Rehfeldt.

American Steel & Wire Co., Chicago. Booth 174.
Welding wire. In attendance: B. B. Ayers and others.

Air Reduction Sales Co., New York. Booths 145 and 166.
Airco 99.5 per cent oxygen and Airco acetylene in cylinders; Airco Davis-Bournonville welding and cutting torches; regulators and supplies; Airco Davis-Bournonville oxygen discharge manifold; the Radiagraph, a motor driven portable machine for oxyacetylene cutting of steel plates, billets and forgings to straight lines, circular arcs, or combination of straight lines and circular arcs; the Oxygraph, a motor driven machine of the single pantograph type for oxyacetylene cutting of any shape. In attendance: C. M. Bloodgood, J. M. Bowers, J. E. Rogers, H. L. Rogers, J. L. King, B. C. Rogers, E. Van Alstyne.

Allen & Billmyre Co., Inc., New York. Booth 158.
Tabco centrifugal blowers. In attendance: R. J. Heller and others.

Allis-Chalmers Mfg. Co., Milwaukee. Booth 338.
Type AR roller bearing motor of the inclosed self ventilating type; a new Allis-Chalmers Texrope drive; centrifugal pumping unit with cut-away section showing details of construction of pump and roller bearing motor. In attendance: J. W. Shaw, C. M. Davis, G. C. Culver, R. F. Potter, R. H. Jackson, Harry Migneault.

Ampco Twist Drill Co., Jackson, Mich. Booth 266.
High speed drills and reamers and automatic machinery. In attendance: L. C. Bloomfield, Ben Jones, F. J. Sikorovsky, George Melling, C. T. Goodwill, Don Noble, George Mitchell, David O'Brien.

B. C. Ames Co., Waltham, Mass. Booth 388.
Ames precision bench lathe with cabinet and gear drive; triplex combination lathe, miller, and drill press; Ames bench milling machine with overarm support; Ames micrometer dial gages. In attendance: Warren Ames and Russell M. Coldwell.

Armstrong-Blum Mfg. Co., Chicago. Booth 461.
Marvel products as follows: Metal band saw, demonstrating the features of this tool as applicable to stock room, tool room, miscellaneous, and production work; high speed saw, demonstrating difficult cutting-off work in alloy metals at exceptionally high speed; automatic high speed saw running on a typical automatic production job; hack saw machines; high-speed-edge hack saw blade. A new product which is a composition blade, with 18 per cent tungsten high speed steel electrically welded to a non-breakable back or body. In attendance: Harry J. Blum, Stanley A. Woleben, Joseph C. Fletcher, Walter S. Ryan, Charles P. Ryan, Charles T. Ameel.

Armstrong Brothers Tool Co., Chicago. Booth 459.
Tool holders, lathe dogs, clamps, ratchet drills, drop forged wrenches, pipe vises, pipe cutters, stocks and dies, pipe wrenches and chain tongs. In attendance: Horace Armstrong, Paul L. Armstrong, A. F. Arbogast, George L. Nufer.

Armstrong Cork & Insulation Co., Pittsburgh. Booth 450.
Nonpareil and Armstrong's insulating brick and other high temperature insulating materials; Armstrong's corkboard, cork covering, Linotile and cork tile; mechanical cork specialties. In attendance: W. C. Rasch, J. N. O'Connor, R. H. Craig, R. L. Matthews, E. S. Hildreth.

E. C. Atkins & Co., Indianapolis. Booth 214.
Exhibiting (in operation): Silver-steel hand and power hacksaw blades; No. 18 and No. 7 Kwik-kut power hacksaw machines, using Silver-steel power hacksaw blades; No. 4 metal cutting bandsaw machine cutting annealed high speed steel; Cantol belt wax; and various saws. In attendance: Edward S. Norvell, B. D. Tompson, Robert Eveland, L. Blackwell, W. R. Chapin, E. C. Atkins.

Atlas Steel Corporation, Dunkirk, N. Y. Booth 440.
Hot-rolled, cold drawn, and drop forged tool steel products, consisting of carbon tool steel, high speed steel, and special alloy steels; various dies, tools, jigs and fixtures showing application of these types of tool steel, together with performance data; samples and products showing application of regular and special types of stainless steels. In attendance: A. F. Dohn, F. B. Lounsberry, C. P. Burgess, W. H. Wills, J. C. Gearhardt, G. Eger, D. G. Hoyt, W. Breeler.

W. O. Barnes Co., Inc., Detroit. Booth 488B.
Hack saw blades and band saws; hack saw machine, motor equipped and cutting steels; special display of Barnes Red Arrow high speed steel hack saw blades. In attendance: W. O. Barnes, J. H. Flavell, C. B. Cecil, F. M. Shaw, C. G. VanTuyl.

Barnes-Gibson-Raymond, Inc., Detroit. Booth 329.
Types of wire and flat springs of all materials; leaf and cushion springs. In attendance: L. D. Adams, W. J. Black, F. C. Adams, F. P. Zimmerli, H. Rodemiger.

John Bath & Co., Inc., Worcester, Mass. Booth 228.
Ground thread taps, all threads ground from the solid; ground thread gages; ground thread rolling dies; Bath Progressive cut acme tap, featuring various materials tapped successfully; Bath internal micrometers; and Bath master rings. In attendance: John Bath, J. Chester Bath, R. E. Lamb, E. A. Walker, S. W. Bath.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth 340.
See illustration on page 639. In attendance: H. L. Shippy, F. C. Lau, W. A. Carter, I. L. Nixon, W. L. Patterson, G. Gallasch.

Bell & Gossett Co., Chicago. Booth 445.
Oil coolers, Caselte, Bohnite, Cleancoat, Non-Case, Drawite, pressed steel pots; BG No. 40 high temperature cement. In attendance: W. C. Bell, E. J. Gossett, James S. Ayling, B. C. Cleveland.

Bellis Heat Treating Co., Branford, Conn. Booth 117.
Lavite furnaces in operation; work that has been heat treated in Lavite, including threading tools, gears, punches, drills, wire, non-ferrous alloys, stainless steel, and high speed steel tools of record performances.

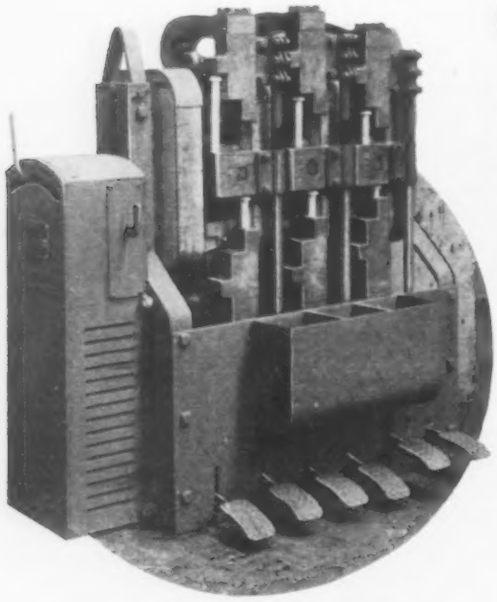
Chicago Chapter

T. E. Barker,
Accurate Steel Treating Co., Chairman

Adam M. Steever,
Great Lakes Forge Co., Vice-Chairman

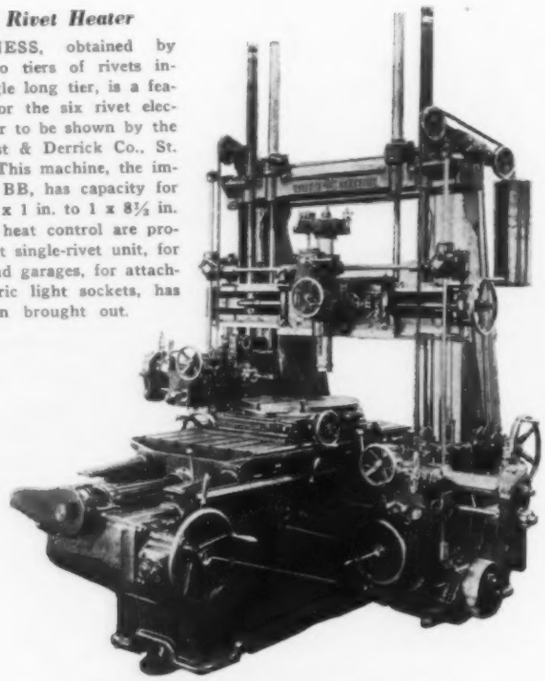
Arthur G. Henry,
Danly Machine Specialties, Inc., Secretary-Treasurer

Exhibits at Steel Treaters' Meeting in Detroit



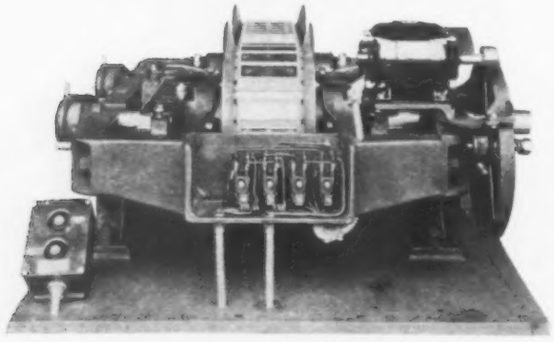
Electric Rivet Heater

COMPACTNESS, obtained by having two tiers of rivets instead of a single long tier, is a feature claimed for the six rivet electric rivet heater to be shown by the American Hoist & Derrick Co., St. Paul, Minn. This machine, the improved Model BB, has capacity for rivets from ¼ x 1 in. to 1 x 8½ in. Nine steps of heat control are provided. A light single-rivet unit, for small shops and garages, for attachment to electric light sockets, has also been brought out.



Three-Spindle Jig Boring Machine

ALOCATING and jig boring machine, shown above, made by the Société Genevoise d'Instruments de Physique of Geneva, Switzerland, and exhibited here for the first time. will be in the booth of the R. Y. Ferner Co., Washington, the American agent. The machine provides for the accurate boring of box jigs on five sides without change of set-up, while at the same time affording facilities for doing large flat jobs in the manner of other jig boring machines. It has three spindles and performs work in all the three coordinates of length, width and height, and it is designed so that three holes can be bored in exactly the same plane simultaneously, the direction of one being at right angles to the other two, while the second and third holes may be from opposite the direction of one being at right angles to the other two.

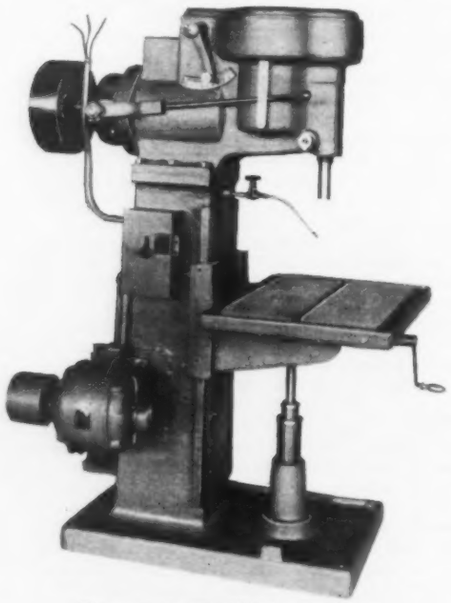


Reeves Electrical Remote Control

ELECTRICAL remote control, designed for use with Reeves variable speed transmission, will be shown by the Reeves Pulley Co., Columbus, Ind. It is illustrated above. The control apparatus includes a reversible motor connected to the shifting screw of the transmission by spur gears, the motor being started by means of a push button. The device permits control from any part of a machine or from any place in the plant.

Nibbling Machines for Cutting Sheet Metal Parts

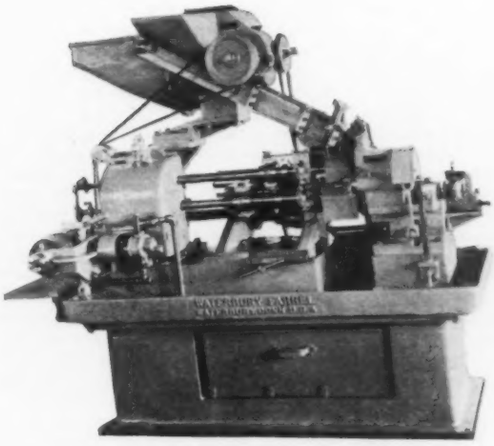
PRODUCTION records of Campbell nibbling machines will be featured in the exhibit of Andrew C. Campbell, Inc., Bridgeport, Conn. Two recent models will be shown, the No. 0 and No. 1-A. The No. 0 machine, shown at left, is for cutting thin stock up to No. 14 gage or 3/32-in. It is used for trimming embossed work, duplicating small parts, template making, etc. The cutting speed is 60 in. per min. Production records on one of the larger machines to which attention will be called are these: Cams for Brown & Sharpe screw machines, from 20 to 55 sec.; gear guard from ⅛-in. steel, 2½ min.; cash register lever from 1/16-in. steel, 48 sec.; grille from 1/16-in. brass plate, 2¾ min.



Pneumatic Oscillating Tapper

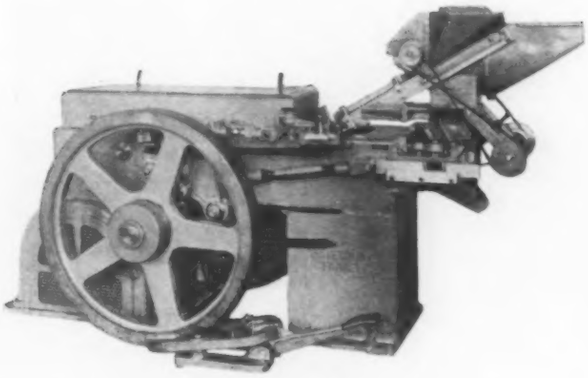
AN improved form of tapper (above) is to be shown by the W. Gaterman Mfg. Co., Manitowoc, Wis. The improvement over previous machines is in the box type construction and in the six-speed geared transmission. The latter is contained in the horizontal barrel, while the forward and reverse clutch transmission are in the vertical barrel. Each is inserted into the head of the machine as a complete assembly.

Exhibits at Steel Treaters' Meeting in Detroit



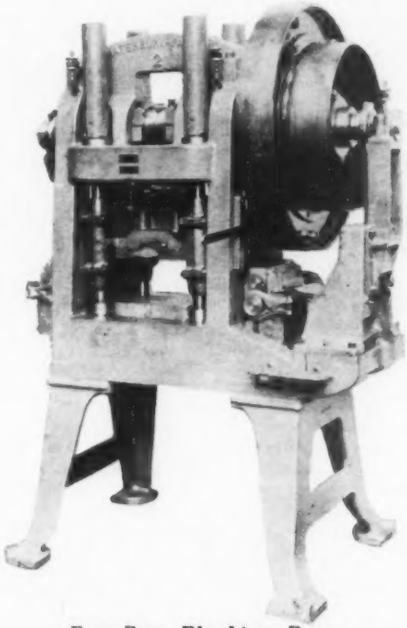
Combination Pointer and Threader

A NEW automatic machine for pointing and cutting threads on bolts, illustrated above, will be exhibited by the Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. The pointing is done with a box tool and the threading with a standard die-head of any specified commercial type. The machine illustrated above has a capacity for ⅜-in. diameter bolts, ¾ in. to 6 in. long under the head; it will thread up to within ¼ in. of the under side of the head and will cut a thread 2¼ in. long. Cutting speeds range from 25 to 45 ft. per min. and usual production is 360 to 2000 bolts per hr.



Automatic Bolt Head Trimmer

AN entirely new design of automatic bolt head trimming machine, shown above, has been added to the line of cold-process bolt machinery of the Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. Features include complete separation of chips and trimmed blanks, higher speed than previously, positive ejection of all trimmed blanks through the die, ability to trim any length without special tooling, newly designed rotor hopper feed, improved transfer mechanism for carrying the blanks from the feed chute to the tools. Its capacity is ⅝ in. diameter by ⅝ to 4½ in. long; production per min., 115.

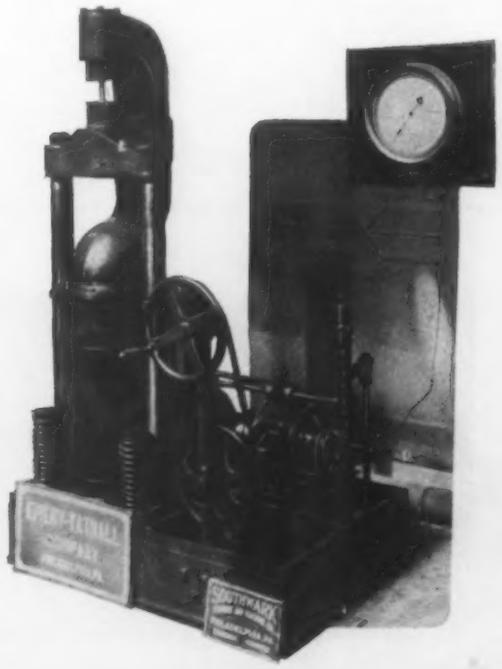


Four-Post Blanking Press

ACCURACY of blanking and follow tool work is claimed for the four-post blanking press, shown above, recently brought out by the Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn. New features include: gate gear alinement with bearings above and below the tools; shock-absorbing flywheel of assembled construction; patented friction mechanism permitting stopping the press quickly from high speed; tools and work in full view from all sides and readily accessible; double gate connections which are sold and simultaneously adjusted; double friction roll feeds; hand and automatic roll releases.

Electric Tempering Furnace

THE newest piece of equipment which the Leeds & Northrup Co., Philadelphia, will present at the exhibition is the Homo electric tempering furnace, shown at right. It is primarily designed for handling large production and has the distinctive feature of tempering even small parts densely packed with practically perfect uniformity, according to the claims of the company.



Tension Testing Machine

A 60,000-LB. tension machine, at right, designed for complete tension testing of the standard 2-in. by 0.505-in. diameter metal test specimen, will be displayed by the Emery-Tatnall Co., Philadelphia. The machine has been made autographic by the attachment of a special Brown Instrument Co. strip chart recorder, which gives a complete visual study of the tension action.

Philadelphia Chapter

J. R. Adams,
Midvale Co.,
Chairman

Dr. R. H. Patch,
E. F. Houghton & Co.,
Vice-Chairman

A. W. F. Green,
John Illingworth Steel Co.,
Secretary-Treasurer

In attendance: A. E. Bellis, J. W. Black, G. C. Davis, C. E. Wistar, R. C. Jordan, J. J. Lynch.

Bellevue Industrial Furnace Co., Detroit. Booth 121.
Pre-heater type cyanide hardening furnace for camshafts; burners and fire brick. In attendance. W. E. Hinz, E. O. Hinz, L. J. Raymo, C. Voelker, R. Trevathan.

W. N. Best Corporation, New York. Booth 326.
Photographs of furnaces and motion pictures of furnaces in operation. In attendance: H. B. Dempsey, H. E. Vollmers, W. F. Jones.

Bethlehem Steel Co., Bethlehem, Pa. Booths 313-315-332-334.
Products of special interest to the automotive industry. In attendance: A. P. Spooner, J. H. Stell, M. W. Dalrymple, G. B. Troxell, A. McDonald, W. Hartman, T. G. Foulkes, W. R. Shimer, Thomas Kiernan, J. S. Hegeman, Matthew Ryan, David Roscoe, T. J. Fitzgibbons, R. S. Tucker, Robert MacDonald, F. H. Baldwin, C. E. Chamberlin, W. B. Pritchard, V. H. Miessner, F. E. Fisher.

Alfred O. Blaich Co., Detroit. Booth 321.
Blaich modern carbonizers; cyanides of all grades. In attendance: J. A. Howland, William A. Anderson, S. W. Baldwin, Joseph Pugh.

Black & Decker Mfg. Co., Towson, Md. Booths 218-220.
A complete line of high cycle portable electric drills, electric screw drivers, electric nut runners, and electric grinders. In attendance: S. D. Black, W. C. Allen, R. D. Black, R. E. Mizener, W. A. Marschke, H. B. Hazerodt, J. A. Fairfield, A. H. Walker, W. T. Johnson, W. J. Fenwick, H. B. Austin.

G. S. Blakeslee & Co., Cicero, Ill. Booth 265.
Blakeslee Niagara-type parts washing machines and Blakeslee pump-type parts washing machines. In attendance: John W. Dammers, George Anderson, A. L. Reichel.

Bliss & Laughlin, Inc., Harvey, Ill. Booth 371.
Cold drawn steel, and turned and polished shafting; rounds, flats, squares and hexagons; parts and products manufactured from the foregoing. In attendance: Walter R. Howell, W. P. Mitchell, T. D. Taylor, C. L. Huff, W. W. Wilson, C. H. Beach.

Botfield Refractories Co., Philadelphia. Booth 154.
Adamant fire brick cement; Adachrome, used as the aggregate or body material in making refractory coating mixtures for gun applications on furnace linings; Adamant Gun, used for applying refractory mixtures composed of Adamant, cement and Adachrome as coatings for furnace linings. In attendance: Axel H. Engstrom, W. B. Smith, S. Latt, J. J. Sweeney, J. G. Armstrong.

Bourne-Fuller Co., Cleveland. Booth 472.
Alloy and carbon steel, Climax alloy staybolt steel, bolts, nuts and rivets, tool steel, concrete reinforcing steel. In attendance: H. H. Pleasance, A. U. Klingman, C. F Newpher, N. K. Hartford, H. D. Burket, T. W. McGrath, C. J. Brug, R. B. Gibson, W. B. Dunham, R. E. Ellas.

Boyer-Campbell Co., Detroit. Booth 386.
See illustration on page 634. In attendance: Warren Ames, Albert A. North, Clyde W. Blakeslee, R. N. Brayer, Harry G. Procunier.

Bristol Co., Waterbury, Conn. Booths 274A and 335.
Bristo hollow head set screws with dovetail flutes; complete line of hollow cap screws with the Bristol dovetail flutes; complete line of belt plates and belt rivets; line of automatic temperature controllers, and pyrometers for controlling electric furnaces, gas furnaces and oil fired furnaces; automatic valves connected to the pyrometers; electric panels with relays and main line switches connected to the controlling pyrometers; Bristol recording pyrometers and Bristol indicating pyrometers of the latest improved type, with special thermocouples designed for heat treating furnaces. In attenance: H. L. Griggs, J. B. Kelsey, C. W. Bristol, H. W. Moss, L. G. Bean, R. M. Walk, C. C. Eagle, J. S. Mayberry, W. F. Emery, E. C. Allen.

D. P. Brown & Co., Detroit. Booth 333A.
Teon belting, a waterproof, oilproof fabric belt, made in England; Brown's woven endless belts; Brown's black belt, a new leather belting; compressed spruce pulleys; American pressed steel hangers. In attendance: William Rawle Brown, W. W. Nichols, George I. Bouton, R. W. Holden.

Brown Instrument Co., Philadelphia. Booth 443.
See illustration on page 642. In attendance: R. P. Brown, George W. Keller, R. W. Mayer, C. L. Saunders, and Messrs. Sherwin, Conwell, Frazee and Flower.

Brown Lynch Scott Co., Monmouth, Ill. Booth 429A.
Perfection carburizing compound cleanser and grader, a steel motor driven sieving machine for cleaning and grading carburizing compound, sand or practically any material which may be cleaned by the sieving method. In attendance: F. C. Hoy.

Brown-McLaren Mfg. Co., Detroit. Booth 457A.
Automatic screw products in brass, steel and monel metal; automobile chokes, Connell adjustable reamers, Brown and Sharpe cams and forming tools. In attendance: C. C. Heath, Lincoln E. Walker, W. E. Moore.

Buckeye Twist Drill Co., Alliance, Ohio. Booth 488.
A complete line of twist drills, reamers, special tools. In attendance: A. A. Mulac, J. F. Bell.

Buffalo Forge Co., Buffalo. Booth 245.
See illustration on page 638. In attendance H. W. Wendt, Jr., E. G. Leonard, A. T. Yates, H. H. Weber, G. Zimmer, W. J. McDowell, A. T. Lamb.

Andrew C. Campbell, Inc., Bridgeport, Conn. Booth 249.
See illustration on page 622. In attendance: Stuart Naramore, J. Johnson.

Carbic Mfg. Co., Duluth, Minn. Booth 168A.
Carbic cakes (compressed carbide); Carbic low pressure portable generators; Carbic welding and cutting torches. In attendance: R. C. Duncan, J. L. Lowther.

Carborundum Co., Niagara Falls, N. Y. Booth 316.
Carborundum segmental chuck for use on Blanchard vertical surface grinders; Carborundum Co.'s new AA Aloxite tool room wheels; Aloxite and Carborundum Quadruplex improved disks; Aloxite and Carborundum Redmanol cut-off wheels; Aloxite and Carborundum rubber cut-off wheels; complete line of snagging wheels for steel, malleable and gray iron castings; complete line of cylindrical grinding wheels for steel and gray

Pittsburgh Chapter

J. P. Gill,
Vanadium-Alloys Steel Co.,
Chairman

W. H. Phillips,
Molybdenum Corp. of America,
Past Chairman

W. I. McInerney,
Pittsburgh Crucible Steel Co.,
Vice-Chairman

H. L. Walker,
Secretary-Treasurer

iron, featuring 36-in. crankshaft wheels for Landis hydraulic crank grinder. In attendance: S. F. Courter, Anthony Dobson, F. J. Tone, Jr., John Storm, C. H. Niekamp, J. C. Gallen, H. S. Munroe.

Carborundum Co., Perth Amboy, N. J. Booth 114.
Wire annealing furnace designed to draw the wire through Carbofrax brick; car type annealing furnace heated with carboradiant chambers for either oil or gas fuel; Carbofrax recuperator designed to take full advantage of high thermal conductivity and refractoriness of Carbofrax tubes; standard Carbofrax, Aloxite and Infrax brick and tile; Carbofrax refractory cements. In attendance: R. A. Beverley, C. A. Dutton, J. A. King, W. M. Smith, S. A. Fenno.

Carpenter Steel Co., Reading, Pa. Booths 435-464.
Fine tools made of various tool-steels; airplane parts forged from alloys; display of tools and utensils made of stainless steels. In attendance: F. A. Bigelow, J. H. Parker, W. S. Jones, R. V. Mann, F. R. Palmer, G. H. Edmonds, J. B. Guthrie, H. J. Joyce, Jr., C. W. Olsen, C. A. Heil, R. L. Williams, J. M. Millard, F. W. Curtis, J. A. Nolan, F. C. Phillips, C. H. Breed, W. A. Armstrong.

Case Hardening Service Co., Cleveland. Booth 445.
Bohnite, case hardening compounds; Caseite, cyanide hardening compound; Non-Case, anti-carbonizing paint; Pres-Steel pots; carbonizing boxes, alloy and steel; Drawite, drawing salts; Bathite, hardening salts; Clean-coat, lead bath covering; B-G, rapid oil cooler. In attendance: W. C. Bell, E. J. Gossett, J. S. Ayling, W. H. Ogden.

Cleveland Chapter

Harry H. Smith,
Bourne-Fuller Co., Chairman

W. H. White,
Atlas Steel Corp., Vice-Chairman

J. S. Ayling,
Case Hardening Service Co., Secretary-Treasurer

Chambersburg Engineering Co., Chambersburg, Pa. Booth 231.
Several working models of forging equipment; sample forgings. In attendance: O. C. Mahon, G. R. Murray, Racine Ripley, D. M. McDowell, E. B. Huber, E. R. Frost, J. H. Friedman, D. J. Crowley, K. L. Ernst, C. D. Harmon, Clyde Bordner.

Char Products Co., Indianapolis. Booth 377.
Carburizing compound, annealing carbon and carbon products. In attendance: C. B. Edwards, William Higburg.

Celite Products Co., Los Angeles. Booth 141.
Heat insulating materials, high temperature cement, air-sealing compound for use on brick surfaces, workability agent for concrete. In attendance: C. A. Frankenhoff, John S. Means, T. E. Ventriss, H. N. Haberstroh, Walter K. Kennedy.

Central Steel & Wire Co., Chicago. Booth 172A.
Westinghouse single operator 200 ampere electric welder; all grades of Swedox electrodes and filler rods; hot rolled steel, all shapes and sizes; wires and all kinds of magnets. In attendance: J. G. Norris, J. S. Gorman, F. S. Hunt.

Central Alloy Steel Corporation, Massillon, Ohio. Booths 428-430-432.
Racing car designed and built by Earl Cooper; Enduro stainless iron; Agathon alloy steels; Toncan copper-molybdenum iron. In attendance: J. M. Schlendorf, B. F. Fairless, A. Schaeffer, J. R. Morris.

Chambersburg-National. Booths 231-254.
Forge equipment. This is the sales organization of the Chambersburg Engineering Co. and the National Machinery Co. Listings appear under these two names.

Chesterfield Metal Co., Detroit. Booth 235.
A high speed cutting alloy, shown in the form of cutting tools and bar stock; also special castings having a high wear resistance. In attendance: E. J. Laskowski, E. M. Scott.

Chicago Pneumatic Tool Co., Detroit. Booths 224 and 226.
A complete line of company's products, featuring Hicycle drills, reamers, grinders, screw drivers and nut runners. Boyer pneumatic hammers and Little Giant air drills. In attendance: T. P. Harris, L. J. Walker, H. G. Barbee, A. M. Hanna, P. J. Hamilton, C. B. Coates, E. W. Stevens, H. C. Gilligan, L. R. Covert, W. A. Sisney, C. A. Searle, Walter Billany, G. C. Robinson, Edward Hembly, L. R. Gavan, N. J. Miller, George Gates, P. E. Slattery, George McDowell.

New York Chapter

Charles McKnight,
International Nickel Co., Chairman

Francis F. Lucas,
Bell Telephone Laboratories, Inc., Vice-Chairman

T. N. Holden, Jr.,
E. W. Bliss Co., Secretary-Treasurer

Chicago Steel & Wire Co., Chicago. Booth 168.
See illustration on page 635.

Costello Engineering Co., Pittsburgh. Booth 119.
Gas, oil and combination gas and oil burners, small general hardening furnace, blast gates and duplex oil strainers. In attendance: From Costello Engineering Co.: E. O. Mueller, P. J. Myall, W. H. Scheib; from Tate-Jones & Co., K. T. Davis.

Chicago Screw Co., Chicago. Booth 328.
Hardened and ground alloy bolts, made by the upset head process and milled from the bar. In attendance: G. E. Snyder, W. J. Finn.

Chicago Steel Foundry Co., Chicago. Booth 323.
See illustration on page 635. In attendance: David Evans, A. Blackwood, C. McA. Evans, Herman J. Georgen.

Chisholm-Moore Mfg. Co., Cleveland. Booth 348.
Cyclone high speed chain hoist, Timken roller bearing trolleys, I-beam trolleys, C-M electric hoists, C-M vat-handling electric hoists, C-M overhead traveling cranes. In attendance: J. R. Mears, E. J. Newton, W. H. Morgan, F. F. Seaman.

Chrobaltic Tool Co., Detroit. Booth 417A.
Heat resisting and special alloy castings, electric resistance grids, retorts for gas carburizing furnaces, Valencite—a metallurgical compound for improving the physical and machining properties of cast iron, introduced in the ladle. In attendance: W. B. Sullivan, L. H. Whiteside, J. W. Mull, Jr., A. A. Cash, C. M. Conner.

Cincinnati Planer Co., Cincinnati. Booth 261.
See illustration on page 639. In attendance: B. B. Quillen, George Langen, C. E. Linden, O. C. Willey, George Lamoth.

Clipper Belt Lacer Co., Grand Rapids, Mich. Booth 247.
See illustration on page 634. In attendance: Earl H. Forsyth and others.

Clark Tructractor Co., Battle Creek, Mich. Booth 412.
See illustration on page 629. In attendance: J. W. Taylor, R. J. Burrows, Ezra W. Clark, C. I. Ucker.

Cleveland Twist Drill Co., Cleveland. Booths 111-113-132-134.

Boston Chapter

L. D. Hawkridge,
Hawkridge Brothers Co., Chairman

H. B. Parker,
Tremont Mfg. Co., Vice-Chairman

H. E. Handy,
Saco-Lowell Shops, Secretary-Treasurer

Hartford Chapter

David A. Nemser, Pratt & Whitney Co., Chairman

John C. Kielman, New Departure Mfg. Co., Vice-Chairman

Henry I. Moore, Firth-Sterling Steel Co., Secretary-Treasurer

Two high power drill presses demonstrating Cle-Forge high speed drills in steel and cast iron; a high speed sensitive drill press demonstrating brass drilling; display of complete line of products, including Spirex machine pin reamers and exhibit showing the cutting action of a drill. In attendance: W. E. Caldwell, H. P. Jenson, A. J. Ireland, H. E. Bergquist, F. M. Hoelzle, H. Puckhaber, I. P. Farnum, Thomas Thomas, F. A. Kelly, J. C. Hogan, H. J. Baier, J. B. Dillard, T. M. Skove, D. D. Burdette.

Climax Molybdenum Co., New York. Booth 416.
Molybdenum ores and products. In attendance: B. F. Phillipson, F. C. Langenberg, Alan Kissock, W. P. Woodside, J. Kent Smith.

Colonial Steel Co., Detroit. Booths 449-476.
Miscellaneous grades of tool steel. In attendance: R. M. Brushingham, Lawrence Wood, T. Howe Nimick, N. B. Hoffman, E. P. Geary, G. B. Ferguson, L. T. McKinnon, H. L. Welsh, W. J. Smale, R. W. Harris, J. S. Froelich.

Columbia Tool Steel Co., Chicago Heights, Ill. Booth 133.
New and used tools of all kinds; parts made of tool steel. In attendance: Arthur T. Clarage, Alex Luttrell, G. C. Beebe, F. A. Terry, E. H. Pasmore, A. J. Scheid, B. H. Phillips, A. N. Johnston, W. G. Sonderman, E. D. Roberts, L. E. Dallas.

Cooper-Hewitt Electric Co., Hoboken, N. J. Booth 213. See illustration on page 638.
In attendance: Charles F. Strebig, D. R. Grandy, H. M. Ferree, G. R. Clover, H. T. Braschler, W. W. Becky.

Craine-Schrage Steel Co., Detroit. Booth 312.
Cold drawn bar steel, hot-rolled tool steel, cold-rolled strip steel. In attendance: C. D. Craine, Charles H. Walker, F. L. Woodside, W. B. Wiley, J. S. McClelland, R. W. Jones, T. E. King.

Crucible Steel Co. of America, New York. Booths 337, 339, 341, 356, 358 and 360.
Apparatus demonstrating the salt spray test on non-corrosive metals; parts made of various grades of non-corrosive, high speed, H Y C C, tool, alloy and machinery steel; cold drawn specialties. In attendance: F. B. Hufnagel, J. A. Mathews, A. T. Galbraith, R. W. Crane, F. E. Phelps, A. H. Kingsbury, I. S. Warren.

Cushman Chuck Co., Hartford, Conn. Booth 310.
Cushman lathe chucks. In attendance: Harry E. Sloan, Harry W. Hultgren, George H. Pratt, George Highberg.

Danly Machine Specialties, Inc., Cicero, Ill. Booth 212.
Die sets, leader pins, bushings, die shoes, punch holders, dowel pins, pry bars, goose neck clamps, swivel head cap screws, automatic stock stop for punch presses, Unbrako hollow head cap screws, pressure pad springs, stripper bolts, laps and lap arbors, and Danly transparent die set templets. In attendance: P. H. Danly, Arthur G. Henry, A. G. Gullberg, A. L. Miller, H. F. Landon, Joseph Felber, A. F. Wallace, J. R. Fitzsimmons.

Darwin & Milner, Cleveland. Booths 318 and 320.
A general line of products, including dies and various tools; special alloy steels, notably the Neor brand, and patented Cobalt-Crom PRK-33. In attendance: V. F. J. Tlach.

Davison Gas Burner & Welding Co., Pittsburgh. Booth 116.
Gas burners working on line pressure, also with forced draft; fuel oil burners using low pressure for atomization; domestic oil burners. In attendance: F. F. Davison, Edward Poor.

Dearborn Chemical Co., Chicago. Booth 477.
No-Ox-Id, chemically compounded rust preventive. In attendance: E. M. Converse, C. I. Loudenback, J. A. Crenner, C. A. Remsen.

Detroit Seamless Steel Tubes Co., Detroit. Booth 458.
Seamless steel tubes, cold drawn and hot-rolled for the automotive industry, also for locomotive, marine and stationary boilers, and for the oil, chemical and paper industries for use in still and evaporators; in sizes ⅛ in. outside diameter up to and including 5½ in. outside diameter. In attendance: C. H. Hobbs, S. H. Worrell, H. E. Ross, R. Berryman.

Detroit Sheet Metal Works, Detroit. Booth 391.
D. S. M. self-cleaning metal parts washing machine, for removing oils, chips, drawing compounds, etc., from stamped or machined parts in preparation for plating, painting, enameling, etc.; D. S. M. No-Thru-Metal-

Dayton Chapter

Otto Z. Klopsch, Frigidaire Corporation, Vice-Chairman

Fred M. Reiter, Dayton Power & Light Co., Secretary-Treasurer

Lehigh Valley Chapter

L. J. MacGregor, Bonney Forge & Tool Works, Chairman

Walter L. Trumbauer, Bethlehem Steel Co., Vice-Chairman

H. V. Apgar, Ingersoll-Rand Co., Secretary-Treasurer

type, industrial ovens for drying off after washing, and for drying and baking processes requiring temperatures up to 900 degrees Fahr. In attendance: Wedworth V. Baker, William C. Ehmka, M. J. Whiting.

Henry Disston & Sons, Inc., Philadelphia. Booths 480 and 482.
Cut-off, band, and hack saws, metal cutting saws, files, Disston-made steel, and products made of Disston steel. In attendance: S. Horace Disston, D. W. Jenkins, J. C. Forrest, H. A. Baxter, Joseph L. Dorrington, Edward P. Ludy.

Donner Steel Co., Inc., Buffalo. Booth 487.
Various die rolled automotive parts. In attendance: W. V. Vosmer, J. W. Donner, A. G. Greenamyer, C. A. Cherry, E. D. Pumphrey, P. M. Guba, H. C. Richardson, M. D. Morris, R. E. Sherlock, W. C. Peterson, T. J. Woods, F. H. Lammert.

Driver-Harris Co., Harrison, N. J. Booth 470.
Full line of Nichrome castings, wire products and other miscellaneous products manufactured by this concern. In attendance: W. E. Blythe, L. H. Waldrip, L. V. Prior, H. D. Tietz, J. C. Bilek, H. D. McKinney.

Keith Dunham Co., Chicago. Booth 131.
Complete oxygen and nitrogen production plant with compressing and storage equipment, showing oxygen produced from the air by the liquefaction method; seamless monolithic dissolved acetylene cylinders; welding and cutting apparatus; new process bends, with uniform wall thickness. In attendance: M. Keith Dunham, L. M. Zimmer, C. J. Haines, David A. Ahldin, Don B. McCloud, J. W. Dunham, L. Zengeler.

Duriron Co., Inc., Dayton, Ohio. Booth 431.
All material listed below which is of acid proof material, that is either Duriron or Alcumite: Tank outlets, valves, including plug valves, Duriron mercos, and gate valves; one. No. 40 pump connected for belt drive; ejector;

pipe, both split flanged, and bell and spigot; sink outlet with strainers; No. 45 exhaust fan connected with motor; etching trays; gage glass fittings; Alcumite pickling basket; Alcumite rods, bolts, nuts, washers, etc.; Alcumite pipe and fittings; Duriron sink with outlet trap, etc.; Duriron circulating steam jet arrangement. In attendance: Thomas C. Corin, W. E. Pratt, E. B. Thacker.

Eclipse Fuel Engineering Co., Rockford, Ill. Booth North Woodward Annex.

No. 6 forge equipped with No. 65 low pressure proportional mixer; No. 6 forge equipped with special high pressure gas burners; No. 162 oven furnace equipped with No. 65 low pressure proportional mixer; No. 3621 McKee blower; No. 5 rivet heater equipped with No. 1 high pressure proportional mixer; No. 3—8 in. high speed steel furnace equipped with high pressure proportional mixer; new type core oven burner with secondary air control and No. 2311 blower, with low pressure proportional mixer, and other equipment. In attendance: G. W. McKee, O. M. Olsen, K. A. Scharbau, E. A. Stoner, O. N. Sellers, H. F. Wemple, L. J. Strohmeyer, H. E. Broughton.

Eclipse Interchangeable Counterbore Co., Detroit. Booth 216. See illustration on page 634.

In attendance: R. G. Mitchell, A. C. Warn, J. H. Smith, C. M. Bigger, O. W. Dawson, S. D. Gafford, H. E. Berry, T. J. Fraser, F. E. Harrison.

Edlund Machinery Co., Inc., Cortland, N. Y. Booth 264.

Five Edlund standard drilling machines. In attendance: John Edlund, Carl Edlund, H. K. Edlund, Robert Berry.

Canton-Massillon Chapter

M. H. Schmid, **Central Alloy Steel Corporation, Chairman**

Earl W. Hanna, **American Sheet & Tin Plate Co., Vice-Chairman**

Robert Sergeson, **Central Alloy Steel Corporation, Secretary-Treasurer**

Electric Furnace Co., Salem, Ohio. Booth 164.

Literature and engineering information relative to electric heat treating furnaces of all types. In attendance: R. F. Benzinger, F. T. Cope, F. J. Peterson, A. H. Vaughan, S. Floyd Keener, T. B. Bechtel, N. H. Knowlton.

Electric Arc Cutting & Welding Co., Newark, N. J. Booth 172B.

Alternarc portable cutting and welding devices; newarc electrodes and supplies. In attendance: C. J. Holslag and others.

K. Engelsted, New York. Booth 481.

The oldest existing purchase order issued to Soderfors Steel Works in the year 1288; pictures of the different works in Sweden; a number of steel samples as the steel is now delivered; photomicrographs showing the distinction between the different steels, together with hardening and tempering curves; annealed tool steel which is free from surface decarburization; magnet steel with hysteresis curves. In attendance: Hugo Kurtz, Harry Kurtz, Walter O. Kurtz, Walter R. Flannery, K. Engelsted.

Electro Alloys Co., Elyria, Ohio. Booths 327-346.

Thermalloy retorts, carbonizing boxes, cyanide pots, combustion chambers, recuperators, furnace parts. In attendance: A. L. Garford, W. C. Whyte, J. B. Thomas, J. W. Henry, R. B. McMullen, Jr., A. Miller, Jr., W. J. Hansen, R. B. McMullen, Sr.

Electro Refractories Corporation, Buffalo. Booth 353B.

A new silicon carbide brick in various shapes and sizes; also a high temperature cement. In attendance: Luke U. Milward, David Milward, Grant Diamond.

Elkon Works, Inc., Weehawken, N. J. Booth 153A.

Elkonite welding electrodes. Elkonite represents a group name of electrodes which find their place where copper electrodes fail in resistance welding. In attendance: G. N. Sieger, J. A. Weiger, J. C. Cox, R. R. Tompkins.

Golden Gate Chapter

Dr. W. J. Crook, **Stanford University, Chairman**

S. Craig Alexander, **California & Hawaiian Sugar Refining Corp., Vice-Chairman**

S. R. Thurston, **Bethlehem Shipbuilding Corp., Secretary-Treasurer**

Emery-Tatnall Co., Philadelphia. Booth 336.

See illustration on page 623. In attendance: A. P. Lohmann, A. H. Emery, Jr., Francis G. Tatnall.

Endicott Forging & Mfg. Co., Inc., Endicott, N. Y. Booth 462.

Full line of various types and styles drop forgings from carbon and alloy steel. In attendance: S. J. Marshall, George B. Reed.

Charles Engelhard, Inc., Newark, N. J. Booth 399.

Pyrometers, recording and indicating; thermo-couples; thermo-couple protecting tubes, automatic control; electric resistance thermometers; CO_2 and SO_2 gas analysis apparatus. In attendance: G. E. Pierce, J. H. Oetjen, N. M. Salkover, G. F. Newell.

Erie Foundry Co., Erie, Pa. Booth 250.

Products of company's plants. In attendance: D. A. Currie, H. E. Reed, L. F. Walker, L. F. Carlton, R. B. McDonald, George O. Desautels, M. S. Reed.

Ex-Cell-O Tool & Mfg. Co., Detroit. Booth 211.

See illustration on page 639. In attendance: N. A. Woodworth, Philip H. Huber, C. R. Alden, F. D. Sickle-steel, William F. Wise, J. R. Haycock, W. B. Montgomery, Frank Strother, James Fulks, L. K. Goss, H. E. Henry.

J. N. Fauver Co., Inc., Detroit. Booth 314.

See illustration on page 639. In attendance: C. R. Trimmer, A. W. Smith, H. H. Barrows, E. Rathbun.

Federal Machine & Welder Co., Detroit. Booth 152.

Electric spot welder of new design, foot operated and with a current control covering a wide range of work. The transformer is rugged to care for emergency overloads, and to guard against careless handling. Electric seam welder of new design, developed after years of research. The aim is to produce a seam that is 100 per cent tight under continuous operation, and with a minimum of maintenance attention. The unit is entirely self-contained. Electric butt welder designed for high production control is entirely automatic except for placing the work in the welding dies. Stock is clamped in the dies by compressed air, a push button starts the complete welding cycle, and the current is turned off automatically at the proper point. In attendance: F. P. McBerty, Mrs. A. Z. McBerty, Albert E. Hackett.

Federal Products Corporation, Detroit. Booth 302A.

Dial gages and indicators; various types of inspection tools using the indicator method of measuring, such as

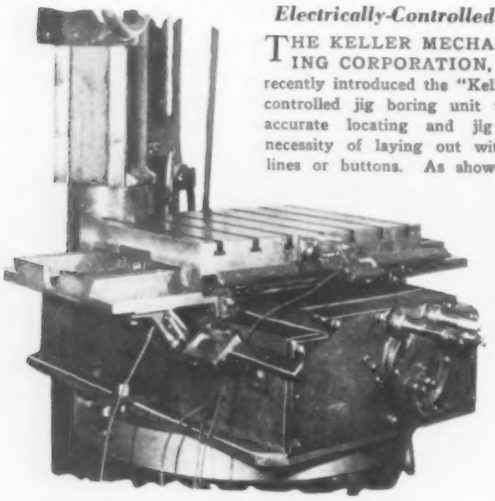
Cincinnati Chapter

A. J. Lucas, **Cincinnati Gear Co., Chairman**

E. M. Wise, **Wadsworth Watch Case Co., Vice-Chairman**

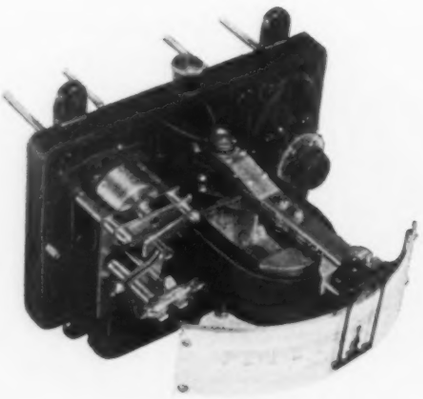
William J. Lange, **Robert J. Anderson, Inc., Secretary-Treasurer**

Exhibits at Steel Treaters' Meeting in Detroit



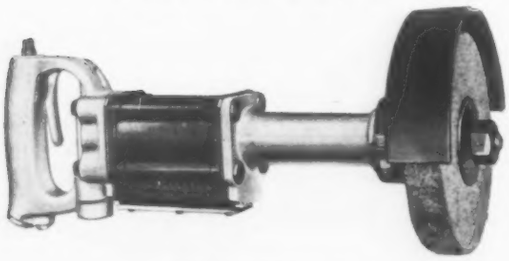
Electrically-Controlled Jig Boring Unit

THE KELLER MECHANICAL ENGINEERING CORPORATION, Brooklyn, N. Y., has recently introduced the "Kellocater," an electrically controlled jig boring unit which is intended for accurate locating and jig boring without the necessity of laying out with the use of scribed lines or buttons. As shown in the picture herewith, it is a compact, portable unit. Locating the work is done by power and the machines is stopped automatically at the desired point.



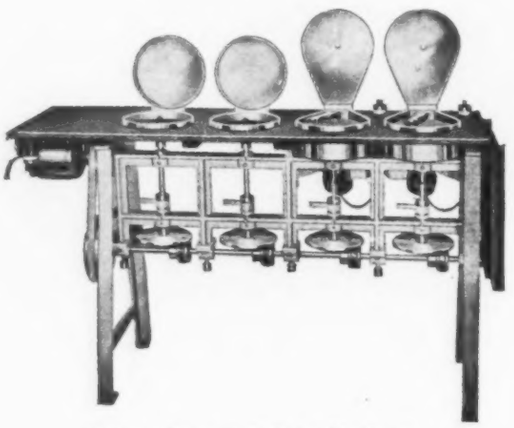
Mercury Switch Temperature Controller

A NEW mercury switch temperature controller has been introduced by the Republic Flow Meters Co., Chicago, and will be exhibited. The illustration above shows the interior of the indicating controller of this instrument. The actual operation of the relays is performed by mercury switches on the clock, and these switches eliminate the necessity of the contact points opening and closing any electrical circuits during the operation on the control.



High Production Air Grinder

THE ROTOR AIR TOOL CO., Cleveland, announces a new "high production" air grinder, designed exclusively for the use of rubber bonded Redmanol or Bakelite wheels. This machine (below) operates under load at 5400 r.p.m., giving 8500 surface ft. per min. The free speed without load is controlled by a quick acting governor which cuts off the air at 5800 r.p.m. Operation continuously at this high speed with unusually low maintenance cost is claimed. It is also claimed that this machine with rubber bonded Redmanol or Bakelite wheels gives an increase in cutting ability of 30 to 50 per cent on cast iron and 35 to 55 per cent on steel.

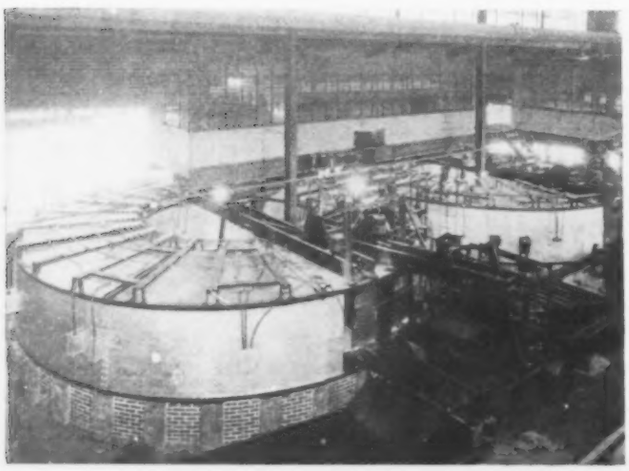


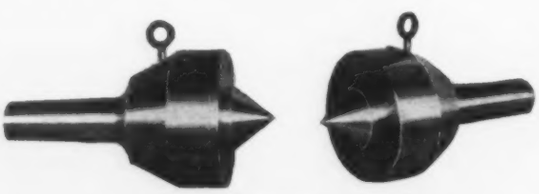
Guthrie-Leitz Polishing Machine

THE latest development in grinding and polishing machines which E. Leitz, Inc., New York, has lately introduced is shown above. This device, known as the Guthrie-Leitz polishing machine, permits three metallurgical specimens to be prepared simultaneously by one operator. These three specimens can be completed, it is stated, in the time required formerly for one specimen, and, in addition, the operator need not give all his time and attention to the work.

Heat Treatment of Crankshafts

APPLICATION of continuous automatic rotary furnaces to the hardening and drawing of crankshafts is pointed to as one of the outstanding developments of the year. The cut below shows an installation of one of these furnaces, built by the George J. Hagan Co., Pittsburgh, in the plant of the Ingalls-Shepard Co., Harvey, Ill. Details of the operation of this furnace and some of the results of its application to the heat treatment of crankshafts were described before the winter sectional meeting of the American Society for Steel Treating at Milwaukee last January, and published in the *Transactions* of the society, and will be explained to visitors at the Exposition.

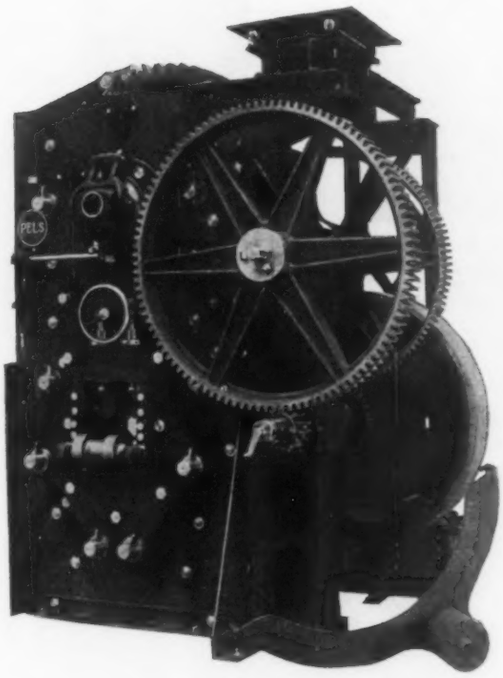




Complete Line of Live Centers

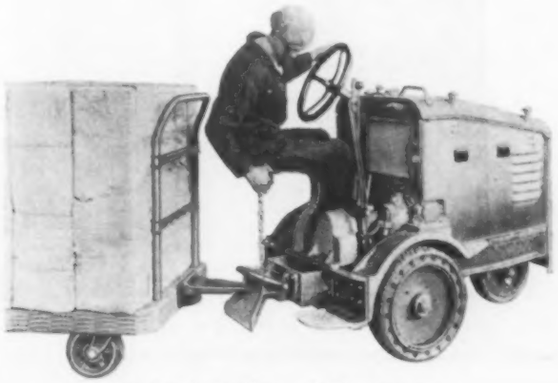
SHOWING for the first time a complete line of live centers for railroad and industrial work, the Kelly Reamer Co., Cleveland, will stress this feature as the important part of its exhibit. The pair of live centers illustrated above is typical of the line, which embraces sizes from the smallest to the largest generally used. Two Timken roller bearings are employed to take the radial and thrust loads. They may be easily adjusted for wear, also have ample strength for the size taper shanks with which they are equipped.

Exhibits at Steel Treaters' Meeting in Detroit



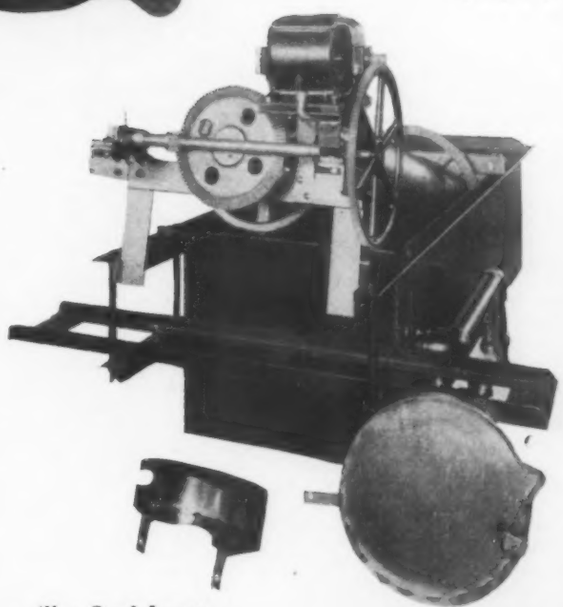
Pels Billet Shear

HENRY PELS & CO., New York, will show their latest style billet shear, type F V No. 75, which bears some special features including a new patented claw clutch, which is fitted on the eccentric shaft and which, it is claimed, insures perfect and safe engaging at all times. It can be arranged to operate continuously or intermittently as may be desired. The machine is designed to cut 7⅝-in. rounds, 7⅛-in. squares and 12 x 4½-in. or 16 x 3¾-in. flats, mild steel cold. The frame is made of heavy forged steel plate, heat treated, and guaranteed against breakage. The machine operates at six strokes per minute at highest capacities.



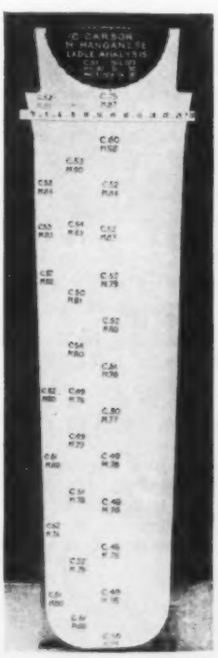
New Steel Trailer and Tructractor

THE CLARK TRUCTRACTOR CO., Battle Creek, Mich., will show for the first time its new steel trailer with the "Clarkat" Tructractor. The latter is a small three-wheeler gasoline propelled industrial tractor, with a wheelbase of but 38 in. and a turning radius of 51 in. The Clark steel trailer is of the caster wheel type with a diamond, corrugated, steel plate platform. It is rubber-tired and comes equipped with the old style, conventional coupler and with the Clark automatic hitch, whereby the driver couples and uncouples the trailer without dismounting from his tractor. It has a platform 3 x 6 ft. with removable racks adjustable for use on ends or sides of platforms. Its capacity is 54 cu. ft. or two tons.



Machine for Quenching and Washing Metal Parts

A MACHINE recently invented by E. G. Greene for quenching and washing small metal parts, which was briefly described in the Aug. 11 issue of THE IRON AGE, will be shown in the booth of the J. W. Kelley Co., Cleveland. The work is dumped into one end of the quenching tank, where it feeds into a rotating drum located in the tank in an inclined position, with the upper end extending above the opposite end of the tank. The machine will take work up to 6 in. long and has a capacity of several tons a day.



Alloy Steel Ingots

IN the booth of the Heppenstall Forge & Knife Co., Pittsburgh, there will be on exhibition two sections of 10-in. and 24-in. ingots taken from regular production heats of alloy steel. They are shown to particularly emphasize the uniformity of the heats as regards segregation. Complete analyses of a large number of drill holes in the ingots will be available, giving not only the carbon and manganese analyses but the phosphorus, silicon and vanadium values in various parts of the ingot which also show quite uniform results. See illustration at left.

Brick Cleaning Machine

THE ROTOR AIR TOOL CO., Cleveland, will exhibit a new portable machine for the reclaiming of open-hearth checker brick, blast furnace brick, soaking pit brick, ordinary building brick, and paving brick. It is claimed that with a crew of three men this machine will clean 3000 9-in. brick per 10-hr. day at 1c. per brick.

Montreal Chapter

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McGill University
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Canadian Machinery and Manufacturing News,
Secretary

cylinder gages, thickness gages, amplifying gages, bench inspection gages; and also gages made up specially for various purposes. In attendance: L. C. Tingley, C. G. Gilbert, H. H. Root.

R. Y. Ferner Co., Washington. Booth 237.
See illustration on page 622. In attendance: R. Y. Ferner, Walter S. Ryan, Charles T. Ameel, M. Stucki, Patrick Ryan.

Ferry Cap & Set Screw Co., Cleveland, Booth 310.
Hex head standard cap screws; standard fillister and flat head cap screws; square head standard set screws; headless set screws; milled studs; clevis pins; connecting rod bolts; special bolts of alloy steels; king bolts; tie rod bolts; spring bolts; special case-hardened and ground bolts; Ferry patented acorn nuts. In attendance: H. D. North, W. M. Leach, A. L. Whittemore.

A. Finkl & Sons, Co., Chicago. Booth 456.
Drop forge supplies, including die blocks, piston rods, hammer rams, (steam and board), hot work die steels, trimmer die steels, and forging machine crankshafts. In attendance: Charles Finkl, William Finkl, M. R. Chase, Fred Finkl, E. H. Graham, T. P. Wallace, J. M. Curley, W. L. Goodrich, W. H. Rieger, F. R. Erb.

Firth Sterling Steel Co., New York. Booths 422, 422A and 424.
Tool and die steel, high speed tool steel, small size octagons being forged under a No. 1 Nazel hammer; small sized chisels hand forged from these octagons for general distribution among visitors. In attendance: L. Gerald Firth, Robert S. Stevick, O. K. Parmiter, G. J. Comstock, A. S. Martin, D. G. Clark, A. E. Barker, O. T. Smith, H. I. Moore, E. T. Jackman, G. A. Jacobs, William Ely Nelson, Willard C. Royce, E. E. Roberts, R. F. Kimber, George J. Bauer, C. O. Ericke, C. E. Hughes, F. N. Mead, I. Olsen, L. S. Russell, Joseph Smith, J. A. Wotan, R. H. Hallagan, F. E. Crocker, Loyd W. Mead, C. D. Moore, Wade H. Davis, C. C. Hamilton, Thomas A. Larecy, W. A. Nungester, W. J. Schulty, Frank Marth, H. L. Wineland, Peter McDonough, Harry Jarvis, D. E. Jackman, Jr.

J. B. Ford Co., Wyandotte, Mich. Booth 304.
Various samples of specialized metal cleaners, adapted for the cleaning of metal surfaces before plating, japanning, enameling, galvanizing, painting, handling, assembling and inspection. They are also used for cleaning before and after heat treatment. In attendance: B. N. Goodell, W. M. Cole, C. S. Tompkins, C. R. Beaubien, S. H. Renton.

Fredericksen Co., Saginaw, Mich. Booth 390.
Sabeco bearing bronze. In attendance: R. F. Agricola, Arthur A. Schupp, Henry Limbach, Ralph Sherry.

Fusion Welding Corporation, associated with the **Chicago Steel & Wire Co., Chicago.** Booth 168.
See illustration on page 635. In attendance: J. B. Green, F. B. Toombs, J. E. Wolcott, K. L. Hansen, J. J. Sacks, R. W. Holt.

Gathmann Engineering Co., Baltimore. Booths 365 and 384.
Ingots, ingot molds, shrink head casings and improved methods of steel production. In attendance: Emil Gathmann, G. C. Dornin, E. A. Whitworth, Mark Gathmann.

Gairing Tool Co., Detroit. Booth 243A.
See illustration on page 642. In attendance: E. Gairing, J. K. Murdock, B. O. Meara, A. J. Hilderschied, H. E. Richmond.

W. Gaterman Mfg. Co., Manitowoc, Wis. Booth 253.
See illustration on page 622. In attendance: W. Gaterman, E. Gaterman, F. H. Kind.

General Electric Co., Schenectady, N. Y. Booth 110, furnaces; Booth 127 and 148, welding.
Electric furnaces in 11 kw., 30 kw. and 5 kw. sizes; two electric welding machines. In attendance: C. F. McLoughlin and others.

Gibb Welding Machines Co., Bay City, Mich. Booth 150.
Small spot welder, large spot welder, entirely new design; standard seam welder; special HO-type seam welder with fixture, entirely new and never has been exhibited before; one arc welder. In attendance: W. H. Gibb, J. R. Brueckner, H. V. Beronius, C. O. Watson, W. O. Little, R. D. Thomas, Charles Rusk, G. J. Myers, John Toleik, Victor Larson, Arthur Jackson.

Gilbert & Barker Mfg. Co., Springfield, Mass. Booth 471.
Heat treating furnaces, both gas and oil fired, and oil burners and oil burning systems; an oil burner utilizing the multi-jet oil tip, an improvement in that with this new tip much finer atomization of the oil is possible; photographs of some of our latest installations; new method of heating core ovens by means of oil. In attendance: M. K. Epstein, F. E. Gibson, S. L. Hauser.

General Alloys Co., Boston. Booths 411-438.
See illustration on page 635. In attendance: H. H. Harris, W. K. Leach, A. L. Grinnell, J. J. Donovan, G. C. McCormick, Robert M. Kirk, W. A. Tuthill, A. D. Heath, H. G. Chase, Walter H. Ogden.

Goddard & Goddard Co., Inc., Detroit. Booth 240.
Milling cutters, both profile and formed types. In attendance: A. N. Goddard, J. K. Murray, Ed. Rummins, E. J. Lipa, A. D. Schneider, C. S. Goddard.

Goodell-Pratt Co., Greenfield, Mass. Booth 274B.
Portable electric drills of various sizes from ⅛ in. to ⅝ in. capacity in operation; precision tools and measuring instruments; mechanics' hand tools. In attendance: F. W. Pratt, Karl C. Rupert, C. L. Jernberg.

Globe Steel Tubes Co., Milwaukee. Booth 303A.
Seamless steel tubing—mechanical, formed and boiler tubing. In attendance: J. S. Bradshaw.

Claud S. Gordon Co., Chicago. Booth 353A.
Pyrometer switches, pyrometer cabinets, pyrometer protecting tubes, nickel-chromium tubes, cyanide and salt bath tubes, service magnets, thermocouples for all makes of instruments and for all purposes. In attendance: Claud S. Gordon, Richard Schoenfeld, S. A. Silbermann.

Goss & De Leeuw Machine Co., New Britain, Conn. Booth 234A.
Multiple spindle automatic chucking machine, single threading, size 6 in. x 6¾ in. In attendance: J. E. Bullock, Stanley T. Goss, J. J. Spring, E. H. Peck.

Groov-Pin Corporation, Long Island City, N. Y. Booth 266B.
Groov-Pins, a patented pin in various diameters up to ½ in. for which holes will be drilled in different materials, and into which Groov-Pins will be driven. In attendance: John A. Richter, B. H. Gerker, Frederick C. Mensing.

George J. Hagan Co., Pittsburgh. Booth 143.
See illustration on page 628. In attendance: R. E. Talley, C. F. Cone, J. Sandberg, V. A. Hain, J. L. Edwards, A. D. Dauch.

Halcomb Steel Co., Syracuse, N. Y. Booths 339-341.
Stainless steels, iron and non-corrosive alloys as supplied to the customer and products made of them; tools made of Dreadnought, Marathon, Ketos and carbon steels; automotive parts, made of Halectralloy, brand alloy steels. In attendance: H. A. Pardee, H. J. Stagg, Charles Schramm, S. C. Spalding, M. P. Spencer, H. Barlow, T. F. Wood, J. F. Kirwan, J. H. Hinkley, A. Schroeder, George Disque, Harry Lang.

R. G. Haskins Co., Chicago. Booth 256B.
Complete line Haskins flexible shaft equipment, showing its many applications to industrial requirements. In attendance: Fred J. Neubauer.

Heppenstall Forge & Knife Co., Pittsburgh. Booth 489.
See illustration on page 629. In attendance: C. W. Heppenstall, B. B. Weinberg, C. J. Sauer, A. J. Porter, Frank C. Moyer, J. A. Succop, G. J. Allen, A. L. Wurster, George O. Desautels, L. A. Daines, D. A. Stuart.

Hevi Duty Electric Co., Milwaukee. Booth 159.
Electric cyanide furnace; box type furnace; other heat-treating equipment. In attendance: E. L. Smalley, F. A. Hansen, C. H. Stevenson, Edward Busch.

Hill-Curtis Co., Detroit. Booth 258.
Single-spindle Rite speed lathe; two-spindle Rite speed lathe; Victory lathe; heavy duty lathe; No. 1½ grinder; No. 1 electric grinder. In attendance: H. J. Kinsbury.

Holcroft & Co., Detroit. Booths 120-120A
Special electric high-speed tool hardening furnace; standard electric forging furnace; special conveyor gas-fired furnace for hot press forging or heat treating. In attendance: C. T. Holcroft, R. T. Cadwell, H. L. Ritts, A. Rukstahl, C. H. Martin, J. B. Pollard, E. M. Smith, C. L. Joy.

C. H. Hollup Corporation, Chicago. Booth 172.
A complete line of Hollup welding wire and equipment for electric arc welding; Wanamaker flux coated electrodes, in various grades and analyses for the welding of cast iron, mild steel, high carbon steel, high manganese steel, high carbon rails and self-hardening alloys; Rex processed bare electrodes for electric arc welding in several different grades and analyses for welding mild steel, bronze, brass, cast iron, etc.; Rex copper coated welding rods for oxy-acetylene welding both commercially pure iron and low carbon steel; Rex arc welding accessories, including face shields, helmets, electrodes, flexible cable, welding lenses, portable sand blast outfits and preheaters; Hollup arc welding machines for direct current welding, driven both by electric motors and gasoline engines, stationary and portable types, in capacities of 200 and 300 amperes. In attendance: H. R. Pennington, K. R. Hare, A. A. Weigel, T. M. Butler, D. E. Cunningham.

Indianapolis Chapter

Clarence H. Beach, Bliss & Laughlin, Inc., Chairman

James S. Marlowe, J. S. Marlowe Co., Secretary

E. J. P. Fisher, Diamond Chain & Mfg. Co., Treasurer

Hoskins Mfg. Co., Detroit. Booth 142.
Electric tool room furnaces; pyrometers, and display of Chromel resistance material. In attendance: W. D. Little, C. S. Kinnison, H. T. Hayes, W. A. Gatward.

E. F. Houghton & Co., Philadelphia. Booths 463 and 490.
Salt baths, Vim leather, Vim packings, lubricating oils, etc.; carburizing materials, cutting oils, cylinder oils, core oils, drawing compounds, heat treating salts, pickling compounds, quenching and tempering oils, rust preventive, cyanides, cleaning materials. In attendance: R. H. Patch, F. L. MacNamara, H. E. Cressman, C. N. Vincent, L. F. Reid, R. H. McCormick, C. E. Murdock, W. J. Wright, George W. Pressell, L. C. Dunn, George S. Rogers, E. C. Barlow, A. J. Jennings, W. G. Harbert, H. E. Beland, C. G. Schultze, J. Coleman Bentley.

Hunter Saw & Machine Co., Pittsburgh. Booth 262.
No. 1, Hunter high speed metal cut-off saw; a No. 0, Hunter high speed metal cut-off saw; inserted tooth saws, friction disks, rivet sets and chisel blanks, and hot and cold saws. In attendance: F. A. Hunter, Sr., F. A. Hunter, Jr., Carl Schnubel, B. L. Stanford.

Hutto Engineering Co., Detroit. Booth 244.
Grinding equipment. In attendance: P. D. Bates and others.

Ideal Industrial Machinery Division, Consolidated Concrete Machinery Corporation, Cincinnati. Booth 237A.
One Ideal 24 x 30 automatic loading and unloading tumbling barrel with sawdust separating screen and power loader. In attendance: N. Ransohoff, C. A. Albrecht, D. M. Powers, H. E. Epley, J. H. Hopp.

Illinois Tool Works, Chicago. Booth 457.
Milling cutters, hobs, etc. In attendance: S. O. Bjornberg, P. J. Nelson, Dan P. Murphy, J. McAllister Gribbie.

Illinois Steel Co., Chicago. Booths 331, 333, 350, 352.
Miniature models of a blast furnace, open hearth, electric furnace and rolling mill, together with a small quantity of the various raw materials used in the manufacture of numerous grades of carbon and alloy steels represented by the S. A. E. series. Through courtesy of Nash Motors Company, a completely assembled chassis, with the various parts marked to indicate the grade and quality of alloy or carbon steel used in their manufacture. Colored views of the manufacture of alloy and carbon steel tell the story from blast furnace to the finished product; and photographs and sketches show new alloy mill at South Chicago. In attendance: W. I. Howland, Jr., G. A. Price, A. L. Meyer, C. R. Moffatt, F. S. Crane, R. G. Glass, C. E. Shattuc, E. J. Janitzky, F. W. Bendell, F. B. Mulvaney, Robert Korsan, S. L. Graham, John Hornbrook, G. W. Landrus, J. H. McKown, H. R. Merritt.

International Nickel Co., New York. Booth 475.
Commercial forms of nickel and typical applications of the more important nickel alloys. In attendance: F. S. Jordan, R. A. Wheeler, E. J. Bothwell, P. D. Merica, T. H. Wickenden, C. McKnight, Jr., D. M. Houston, R. L. Suhl, F. B. Coyle, N. B. Pilling.

Interstate Iron & Steel Co., Chicago. Booths 419 and 448.
Samples of various sections, such as rounds, squares, flats, octagons, hexagons, in both hot rolled and cold drawn finish and showing the range of size and surface the company is prepared to furnish. In attendance: W. J. MacKenzie, E. Larned, W. H. C. Carhart, S. A. Richardson, J. F. White.

Charles L. Jarvis Co., Gildersleeve, Conn. Booth 338A.
Multiple tappers, tapping devices, quick change chucks, nut setting and screw driving chucks. In attendance: Marshall N. Jarvis, Frank C. Barker, John McMeken.

Jessop Steel Co., Washington, Pa. Booth 454.
Products manufactured from stainless steel; specimens of worn punches, dies, etc., which have given exceptional performance in service. In attendance: S. A. Grayson, F. T. H. Youngman, R. K. Greaves, D. J. Hanna, W. A. Salt, C. M. Cunningham, J. C. Dawson, V. M. Wellman, W. J. Frederick, J. M. Curley, A. J. Lambert.

Jones & Laughlin Steel Corporation, Pittsburgh. Booth 354.
Jalcase steel; hot and cold finished steel; parts manufactured therefrom; cold finished products. In attendance: F. D. Heath, R. W. Light, W. E. Danz, W. B. Todd, J. D. Allen, J. S. Grumbling, A. A. Wagner.

J. W. Kelley Co., Cleveland. Booth 345.
See illustration on page 629. In attendance: J. W. Kelley, H. B. Northrup, J. E. Burns.

Kelly Reamer Co., Cleveland. Booth 308.
Adjustable boring and reaming tools for general and production purposes, including single point tools, block unit, roughing and finishing tools; Kelly two point rigid boring bars; multiple blade roughing and finishing cutters; special tool applications for turret lathes, drill press, boring mills, etc. See illustrations of live centers on page 628. In attendance: H. C. Putnam, William Peterson, D. E. Van Deusen.

Keller Mechanical Engineering Corporation, Brooklyn. Booth 259.
See illustration on page 628. In attendance: Jules Diercks, Charles Bitter, D. Forrest Butler, Leon Desautels, Alexander Keller, R. D. Shaw.

C. M. Kemp Mfg. Co., Baltimore. Booth North Woodward Annex.
Proportional air and gas mixing apparatus known as the Kemp System; Chrysler automobile motor-duplicate of block testing operation; internally fired lead pot, gas flame burning under water; heated air blasts, brazing

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American Radiator Co., Secretary-Treasurer

and welding burners, oven burners, swaging furnace for treating tungsten rod, and combustion products circulating radiators. In attendance: W. W. Kemp, W. M. Ponder, W. S. Bassett, William Hunt.

Keystone Lubricating Co., Philadelphia. Booth 306.
The Keystone pneumatic safety lubricator for group or department lubrication from a central point. The exhibit shows the distribution of grease through piping to a number of outlet points. The varied lines of Keystone lubricants for steel mill tractors; ball and roller bearings with samples of Keystone grease for such use. In attendance: H. A. Buzby, P. Cassady, M. C. Schwenk, T. B. Little, F. D. Street, C. O. Norstrum.

Kidder Furnace Co., Canton, Ohio. Booth 136.
Two styles of semi-muffle type heat-treating furnaces, gas-fired, of the single unit design, i.e., motor and fan built in. Do-All furnace consists of semi-muffle oven and a melting furnace mounted on a level, with a small high speed oven just below the other oven, making a pre-heat combination. In attendance: A. B. Kidder, F. M. Buckius.

Kinite Corporation, Milwaukee. Booth 367.
Kinite castings, Kompite castings, Kinite dies, stampings from Kinite and Kompite dies, patterns for Kinite castings. In attendance: P. H. Dorr, E. J. Mohr, K. L. Clark, F. Henderson, T. A. Moormann.

King Refractories Co., Inc., Buffalo. Booth 355.
Flame brand high temperature cements and Mono baffles. In attendance: S. C. Smith, R. A. Smart, William Gaertner, Harry J. Ransley.

Krembs & Co., Chicago. Booth 153.
Brazing and welding fluxes for all purposes: Krembs Kwik-Flo spelter solder, special brazing solders, Fluxine coated rods, flux container and rod holder, dip-brazing furnace, samples of brazed and welded products. In attendance: O. M. Krembs, P. C. Tris, L. J. Schanz.

La Porte Machine & Tool Co., Inc., La Porte, Ind. Booth 390.
See illustration on page 634. In attendance: T. W. Witters, R. N. Brayer.

Leeds & Northrup Co., Philadelphia. Booths 161-163-165.
See illustration on page 623. In attendance: G. W. Tall, Jr., Henry Brewer, A. E. Tarr, P. H. Taylor, J. W. Harsch, E. B. Estabrook, A. F. Moranty, T. C. Smith, G. P. Docherty, J. Korp, C. O. Anderson, T. C. Bennett, R. E. Hansen, W. D. Trueblood, Jr., J. S. Vecella.

E. Leitz, Inc., New York. Booths 451 and 478.
See illustration on page 628. In attendance: R. Tvestmann, Oscar Soetbeer, A. I. Buehler.

Linde Air Products Co., New York. Booths 167, 169 and 171.
Products fabricated by the oxyacetylene welding process, including an all-welded airplane fuselage similar in construction to those used by Lindbergh, Byrd, Chamberlin and Maitland on their transoceanic flights; and an all-welded automobile body typical of the all-metal bodies manufactured today; Stelliting process for Stelliting of metal parts demonstrated; cast iron cutting, bronze welding, steel plate welding, etc., demonstrated. In attendance: R. W. Boggs, W. R. Clark, H. H. Dyar, T. C. Fetherston, R. G. Gunther, F. Langstrom, L. M. Strope, A. G. Wikoff, W. Wissler.

Ludlum Steel Co., Watervliet, N. Y. Booths 349 and 368.
The new patented Ludlum ammonia hardening steel—Nitralloy, together with graphic description and demonstration of a simple method by which it is hardened in ammonia gas at low temperatures without deformation. Demonstrations of the Ludlum Steel Company's line of Delhi rustless irons and stainless steels with examples of parts made from and applications to which these chromium alloys may be put. In attendance: H. G. Batcheller, W. H. Vrooman, C. B. Templeton, R. P. DeVries, H. A. DeFries, V. O. Homerberg, William A. Weaver, R. P. McCarty, E. R. Reeder, P. R. Thurston, W. Kinsey, J. E. Polhemus, H. W. Spiegel, H. I. Askew, J. J. Cruice, A. E. Hope, P. E. Floyd, G. L. Hulben.

MacLeod Co., Cincinnati. Booth 241.
Sand blast cabinet, sand blast hose machine, paint sprayer, one electric butt welder, and one electric rivet heater. In attendance: James Lauder, Walter MacLeod.

Mackintosh-Hemphill Co., Pittsburgh. Booth 453.
The following Adamite products: Forming dies for the cold working and forming of light steel plate, especially work applying to the automotive industry; permanent molds for aluminum castings; skelp bending dies for bending of hot skelp bar to tubular form preparatory to the actual welding of pipe; tube mill sizing rolls for the hot sizing of finished pipe and tubes; roll dies, for rolling shovel steel, hoe plates, fork tines, etc., rolling mill plugs for seamless tube mills; guides for merchant, bar and rod mills; gears, hammer dies, blast furnace pig machine wheels, drawing rings, aluminum melting pots. In attendance: J. R. Patterson, J. M. Lewis, D. L. Mathias.

Mahr Mfg. Co., Minneapolis, Minn. Booth 115.
An oil fired, steel cased and insulated heat treating furnace with temperature automatically controlled by the new Mahr-Harris oil control valve and solenoid operated air valve. The furnace is fired by Mahr triple atomizing oil burner using low pressure air from Mahr individual, direct-connected motor driven blowers; a 3-ft. diameter model rotary hearth forging furnace, fired with Mahr low pressure triple mixing type gas burner; a complete series of low pressure triple atomizing type burners consisting of five sizes. In attendance: W. G. Barstow, C. F. Olmstead, R. M. Hortvet, A. E. Stenzel, Benjamin G. Harmon, C. W. Rudolph, Ray G. White.

McCrosky Tool Corporation, Meadville, Pa. Booth 234.
A complete display of McCrosky Superadjustable reamers including hand, machine and shell types; a complete outfit of McCrosky Wizard quick-change chucks and collets demonstrated in a sensitive radial drill press. Particular attention is given to showing how quickly and easily tools can be changed without stopping the machine. The possibility of tapping blind holes at drilling speed with the aid of a McCrosky Wizard friction drive tapping collet is shown. In attendance: F. P. Miller, C. M. Sutton, R. W. Thomas, Frank Walster, S. P. Miller, Lewis Skeel, Fred Fisher, W. J. Greenleaf, K. B. Spaulding, T. J. Fraser, I. F. Belknap.

Schenectady Chapter

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Albert G. Zima,
Western Crucible Steel Casting Co., Vice-Chairman

Alexis Caswell,
Manufacturers' Association of Minneapolis, Inc., Secretary-Treasurer

McGill Metal Co., Valparaiso, Ind. Booth 413.
A complete line of precision ball bearings in radial, angular contact, and thrust types. These bearings are suitable for machine tool or other applications requiring closer tolerances or quieter operation than is ordinarily necessary; a wide variety of small machine parts, die cast from aluminum bronze. In attendance: Frank R. Schubert, Walter E. Brownell, Thomas L. Robinson.

Metal & Thermit Corporation, New York. Booth 147.
A complete line of samples of the various metals and alloys; also an extensive exhibit of materials and appliances for welding in steel mills. The most important exhibit is a part of a large roll to which a new neck has been welded by means of a thermit weld and which has been sectioned to show the results obtained. On the same specimen, worn driving pads have been built up by new Wabbler thermit. The roll neck welded in this specimen represents one of the largest welding operations in the world. This piece weighs 6000 lb. Many other specimens illustrate how the thermit welding process can be used to advantage for reclaiming broken and worn steel and cast iron sections in steel mills. In attendance: J. H. Deppeler, W. R. Hulbert, C. D. Young, R. L. Browne, A. F. Braid.

Merit Oil Equipment Co., Cleveland. Booth 260.
One Demco high-speed ball bearing sensitive drilling machine, ⅜ in. capacity floor type, motor drive, single speed, 12,000 r.p.m. in operation; one Demco high-speed ball bearing sensitive drilling machine, ⅜ in. capacity floor type, motor drive, 4-speed changes, 12,000, 9000, 6000, 3000 r.p.m.; one 2-spindle Demco high-speed ball bearing sensitive drilling machine, ⅝ in. capacity, 4 speeds; and one 3-spindle Demco high-speed ball bearing sensitive drilling machine, ⅝ in. capacity, 4 speeds. In attendance: C. F. Schenck.

Metalwood Mfg. Co., Detroit. Booth 211A.
B-76 hydraulic broaching press, 5-tons working pressure, 12-in. stroke, semi-automatic or foot control, motor direct connected to Hele-Shaw pump; duplex nut driving machine, designed to drive home the two nuts on the crankshaft end of connection rods all at one time. In attendance: H. C. Nye, G. N. Dorr, Mr. Reynolds.

Michigan Tool Co. and Colonial Tool Co., Detroit. Booth 362.
By Colonial Tool Co.—broaches of all kinds and spline gages; sigh-speed steel broaches for use on high-speed hydraulic broaching machines; Colonial high-speed broaches to operate at a speed of up to 26 ft. per min.; specialty of broach exhibit is the new patented Colonial Easy-Cut Easy-Pull fast production broach, and the new patented High-Speed broach puller. By Michigan Tool Co.—ground and formed tooth hobs, gear shaper cutters, milling cutters, special form milling cutters, saws for steel, copper and mica and numerous other standard and special metal cutting tools. In attendance: E. H. Kurtz, T. A. Oleck, James McKay, Carl Halborg.

Midvale Co., Philadelphia. Booth 363.
Finish machined forgings, rough steel castings, hardened and ground forged steel rolls, automobile body die with tool steel inserts, Diamond brand tool steel tools and dies, Extra High-Speed steel cutters, stainless steel bars. In attendance: A. C. Dinkey, H. L. Frevert, Stuart Hazlewood, Francis Bradley, Henry Ziesing, H. E. Rowe, W. B. Smyth, Fred Sager, Harvey Garrett, Harry Teel, John Glass, Herbert Cox, T. G. Besom, H. E. Rowe.

Alexander Milburn Co., Baltimore. Booth 122B.
See illustration on page 635. In attendance: C. R. Pollard.

Milwaukee Die Casting Co., Milwaukee. Booth 395A.
An assortment of bronze back, babbitt-lined bearings; finished products, either nickel plated or lacquered, and out-board motors in which die castings have been used as an integral part of each product, showing application of the die casting process to products manufactured by different industries. In attendance: Charles Grebe, C. H. Frantz, C. H. Reynolds.

Molybdenum Corporation of America, Pittsburgh. Booth 322.
Specimens of tungsten and molybdenum ores; ferrotungsten and ferromolybdenum, and other molybdenum products; parts made from molybdenum steels. In attendance: Clifton Taylor, G. M. Eaton, W. H. Phillips, E. A. Lucas.

Morse Twist Drill & Machine Co., New Bedford, Mass. Booth 319.
See illustration on page 642. In attendance: W. T. Read, F. O. Lincoln, W. F. Congdon, R. W. Mein.

Motch & Merryweather Machinery Co., Cleveland. Booths 259, 261, and 263.
Products of Keller Mechanical Engineering Corporation, Cincinnati Planer Co., V. & O. Press Co. In attendance: G. E. Merryweather, E. R. Motch, and representatives as given under listing of three companies.

Mueller Brass Co., Port Huron, Mich. Booth 423.
A large and varied display of forgings in brass, bronze, copper and special alloys, seamless brass and copper tubing, and brass and bronze rods; exhibit of fabricated parts, such as screw machine products, S.A.E. fittings, electric refrigerator parts, brass pipe fittings, etc.; samples for various industrial uses of corrosion resisting alloys. In attendance: R. P. Winberg, F. L. Riggin, B. F. Mueller, R. C. Hunter, H. V. Wilkie, H. A. Kliemann, A. Duce, L. A. Mitchell.

National Electric Light Association, Detroit. Booth 434.
Continuous motion picture of some of the applications of electric heat to heat treating. Among the larger ones are those of the Ford Motor Co. and Dodge Brothers, Inc.

National Machinery Co., Tiffin, Ohio. Booth 254.
Several working models of forging equipment; sample forgings on display. In attendance: O. C. Mahon, G. R. Murray, Racine Ripley, D. M. McDowel, E. B. Huber, E. R. Frost, J. H. Friedman, D. J. Crowley, K. L. Ernst, C. D. Harmon, Clyde Bordner.

National Twist Drill & Tool Co., Detroit. Booths 223, 225, 246 and 248.
Parabolic plain milling cutters mounted on a high power milling machine removing metal at a phenomenal rate, believed to be a record performance in milling steel; complete line of high-speed steel cutting tools, including twist drills, reamers, milling cutters, hobs and special tools. In attendance: H. L. McGregor, C. E. Smith, E. J. Chamberlain, J. L. Cook, M. R. Jeffery, J. S. Fogarty, J. W. Davidson, Paul Jerome, C. C. Cornwall,

Tri-City Chapter

E. H. Sohner,
International Harvester Co., Chairman

Lt.-Col. C. F. Jenks,
Rock Island Arsenal, Vice-Chairman

George A. Uhlmeyer,
Peoples Power Co., Secretary-Treasurer

Los Angeles Chapter

Wade Hampton,
Hughes Tool Co., Chairman

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Axelson Machine Co., Vice-Chairman

H. V. Ruth,
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W. E. McCahey,
Northern Indians Public Service Co., Chairman

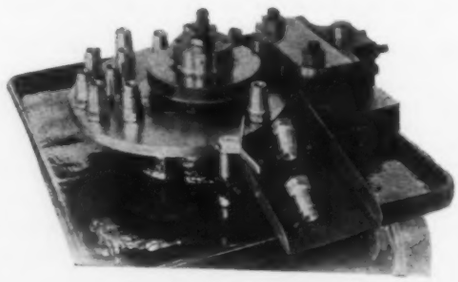
H. B. Knowlton
Vice-chairman

John A. Hansen,
S. F. Bowser & Co., Inc., Secretary-Treasurer

Exhibits at Steel Treaters' Meeting in Detroit

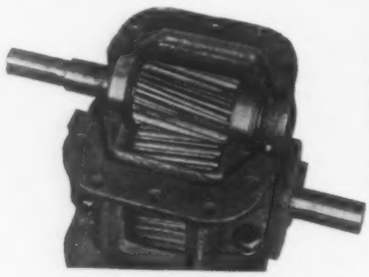
Combination Filer and Flexible Shaft Grinder

AMONG equipment to be shown by the Boyer-Campbell Co., Detroit distributer of tools and manufacturers' supplies, is the Flex filer, a new machine made by the La Porte Machine & Tool Co., La Porte, Ind. Illustrated at left. It performs the double service of a regular filing machine and a flexible shaft unit for grinding and other operations.



Production Marking Machine

RAPID production marking will be demonstrated by the Noble & Westbrook Mfg. Co., Hartford, Conn., on the machine shown above, which was designed for marking such parts as spark plugs, screw machine parts, round bushings and similar articles with sufficient body to be marked without being crushed. The machine is heavier than the company's previous machines and of larger capacity, being capable of 125 pieces per min.

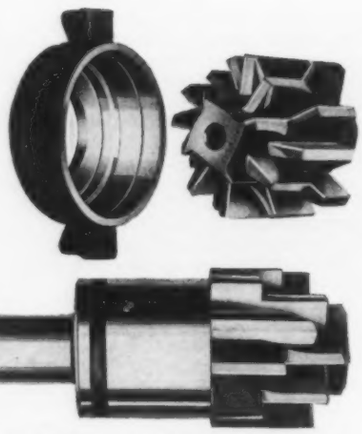


Single and Double Reduction Speed Reducers

SINGLE and double reduction speed reducers of a design recently developed by the R. D. Nuttall Co., Pittsburgh, will be exhibited. Both incorporate the Nuttall 7½-deg. type helical gears, heat treated and hardened; Timken tapered roller bearings, a three-section cage and a positive system of splash lubrication. The illustration above shows part of the single reduction unit with the upper case removed. The company will also exhibit one of its new mill type gear units, having helical type gears and Timken bearings.

Laces Belts Up to 8 In. in 1½ Min.

THE new No. 8 belt lacer, illustrated above, will be shown by the Clipper Belt Lacer Co., Grand Rapids, Mich. It is claimed that the machine will lace both ends of belts up to 8-in. wide in 1½ min. The lacer exerts pressure in excess of 45,000 lb., which is declared to be ample for embedding hooks cleanly and uniformly flush in an 8-in. belt in one operation. Belts from 8 to 16 in. wide are laced in two operations, while belts from 16 to 24 in. can be laced in three operations.



INCREASED production and reduction of tool stock are advantages claimed for the eight-operation "Multi-diameter" cutter, shown above, which is one of the tools to be exhibited by the Eclipse Interchangeable Counterbore Co., Detroit. The tool was designed for use in machining the clutch housings for a motor truck. A roughing and finishing tool machine almost the entire part. A saving of 13.88 min. in machining the part is claimed and, in addition, one lug mill operation was eliminated and a disk grinding operation was cut from 6 min. to 1.8 min.

Electric Hardening Furnace

A NEW model 1600-deg. electric furnace will be shown by the Sentry Co., Taunton, Mass., and will supplement the Size No. 1, Model "HS" Sentry 2400-deg. furnace, which was exhibited last year for the first time and which, with some refinements, is brought to the attention of convention visitors again this year. The model "HS", at left, was designed for the hardening of high-speed steel, for testing refractory materials or for high-speed and carbon steels.

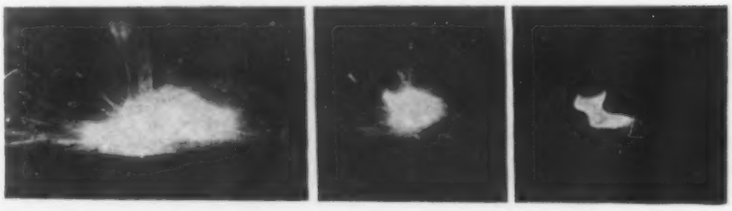
Pot Type Furnaces

TWO new electric pot furnaces for lead, salt, cyanide, babbitt and aluminum will be on display in the booth of the American Metallurgical Corporation, Boston. The type illustrated at right is the 6 x 10 in., which is fully automatic. The other furnace to be exhibited is rectangular; size of pot, 24 x 12 x 17. in. Both have an operating range to 1650 deg. Fahr.

Exhibits at Steel Treaters' Meeting in Detroit

Alloy Non-Cooled Shaft for Continuous Annealing Furnaces

A SPECIAL alloy non-cooled shaft has been developed by Southern Manganese Steel Co. to replace the old style of shaft cooled by water. The shaft, illustrated above, is used in continuous annealing furnaces for sheets and it is claimed that they can be brought to the glowing temperature of the furnace so that the over-all furnace temperature need not be greater than necessary to properly anneal the sheet. It is also claimed that the elimination of heat losses is an obvious advantage from the use of this special shafting, and that the saving in fuel consumption is frequently as great as 50c. per ton of sheet annealed.



Metallic Arc Welding in Movies

SLOW motion pictures, taken in the infra-red light of the electric arc, show that transfer of metal from the electrode to the welded joint is not by vapor, as commonly supposed, but by drops. Above views from the film show drop beginning to form on rod, drop touching joint below, and drop necking off after reaching the weld. These films, together with enlarged projection of actual welding operation, will be exhibited by Chicago Steel & Wire Co., Chicago.

Special Heat-Resisting Alloy Casting

A RATHER interesting and unusual casting has been produced by the General Alloys Co., Boston, made one of that company's special heat-resisting alloys for heat-treating purposes. The casting shown at right, is a one-piece muffle furnace cast in ⅝-in. wall section. The length is 52 in., width 21 in. and height 17 in., and it weighs 476 lb.

Alloy Steel Valve for Waste Heat and Reversing Flues

AN alloy steel valve for waste heat and reversing flues, connected with open-hearth furnaces, developed by the Ohio Steel Foundry Co., Springfield, Ohio, will be exhibited. The principal advantage claimed is that no water-cooling appliances are necessary so that a higher temperature can be maintained in the furnaces.

Extension Sprayer for High Walls and Ceilings

AN extension sprayer, for painting high walls and ceilings without long ladders or scaffolding, has been developed by Alexander Milburn Co., Baltimore, Md., and will be exhibited. It consists of an 8-ft. handle fitting the standard Milburn spray gun, with levers engaging the triggers, and operated through toggles and rods connected to levers near the lower end. Air and paint hose also pass through clips halfway down the handle.

Alloy Steel Annealing Pot

FEATURING the exhibit of the Chicago Steel Foundry Co., Chicago, will be a large annealing pot used for annealing coils of wire. This pot was cast of Pyrasteel, a special alloy steel, to take the place of a previously used pot of built-up sections welded together. The effective life of the built-up pot, it is stated, was approximately 1000 heat hours, but the pot of Pyrasteel is said to have two or three times longer life, having exceptional resistance, it is claimed, to heat and to the corrosive action of nearly all commercial acids.

George Ringstad, F. G. Wright, George Webster, W. G. Base, C. J. Oxford, D. J. Sullivan.

Noble & Westbrook Mfg. Co., Hartford, Conn.
See illustration on page 634.

Northwestern Mfg. Co., Milwaukee. Booth 149A.
See illustration on page 639. In attendance: K. L. Hansen, A. W. Vinson.

Norton Co., Worcester, Mass. Booths 425 and 427.
Several new developments in grinding wheels, such as segmental wheels, special chuck for Blanchard machine, special wheels for cutting off wheels and a machine designed especially for high-speed work; Norton refractory ware, consisting of heat treating furnace tile and hearths, baffle bricks and supports, and other shapes. In attendance: H. W. Dunbar, Herbert Duckworth, Harry B. Lindsay, W. R. Moore, C. W. Jinnette, A. G. Green, W. T. Cushing, D. L. Price, P. B. Brown, H. A. Blackburn, K. H. Bird, H. R. Sandberg.

R. D. Nuttall Co., Pittsburgh. Booth 483.
See illustration on page 634. In attendance: Milton Rupert, R. F. Fiske, J. E. Mullen, C. H. Parker, J. T. Howat, Allan H. Cass.

Ohio Steel Foundry Co., Springfield, Ohio. Booth 357.
See illustration on page 635. In attendance: C. E. Malley, W. J. Hayes, Everett C. White, J. E. Galvin, W. J. Gilmore.

O. K. Tool Co., Inc., Shelton, Conn. Booth 238.
A complete line of O. K. products covering standard tools for lathe, planer, shaper, boring mill and special purpose machines, also the inserted tooth milling cutter for all purposes; a No. 5 Rockford Rigidmill in operation equipped with motor drive for demonstrating O. K. milling cutters. In attendance: R. R. Weddell, Frederick Schroeder, Edward E. Fiege, John W. Costello.

Ohio Seamless Tube Co., Shelby, Ohio. Booth 383.
Seamless steel tubing, cold drawn and hot rolled; special shapes made from seamless tubing, illustrating various steps in the manufacture of seamless tubing; tubing made from carbon and alloy steels used in automobile and aircraft construction. In attendance: J. A. Anderson, W. Anderson, G. E. Goddard.

Tinius Olsen Testing Machine Co., Philadelphia. Booths 379-398.
One 50,000-lb. capacity Olsen latest automatic and autographic universal testing machine, three-screw type, with automotive drive or quick change, eight-speed reverse gear box drive; one universal efficiency testing machine for determining cutting properties of various forms of tools; one 20,000-lb. capacity Olsen universal testing machine, fitted with the newest Olsen-Smith autographic stress-strain instrument, recently developed by Professor Smith of the University of Pittsburgh; one of Professor Haigh's patent alternate stress testing machines; a Honda sharpness tester, developed by Dr. Honda of Japan; several of the Olsen latest direct motor driven, production type Brinell hardness testers, as well as the hand-operated type; Olsen direct motor driven, production type ductility testing machines; M. I. T. folding endurance paper tester; Herbert Pendulum hardness tester; various forms of extensometers, strain gages, etc.; balancing equipment; the latest Olsen-Lundgren automatic weighing, static balancing machines, for balancing automobile tires, clutches, flywheels, or other similar parts that may be balanced satisfactorily statically. In attendance: Thorsten Y. Olsen, Jacob Lundgren, R. B. Lewis.

Page Steel & Wire Co., Bridgeport, Conn. Booth 149.
Armco gas welding wire, Armco electrodes, steel gas welding wire, steel electrodes, welded specimens. In attendance: W. T. Kyle, C. A. McCune, J. J. Flaherty, S. B. Cairns, L. S. Lankton.

Park Chemical Co., Detroit. Booth 309A.
Case-hardening compounds, cyanide mixtures, reheating salts, drawing salts, lacquer-rubbing compounds. In attendance: F. W. Faery, J. C. Thompson, J. N. Bourg.

Parker-Kalon Corporation, New York. Booth 328A.
Hardened metallic drive screws, hardened self-tapping sheet metal screws; also various small assemblies effected with these screws. In attendance: Robert Mitchell, N. Nettleton, H. Goldburg.

Parker Rust Proof Co., Detroit. Booth 160.
Rust proofing powdered chemicals, samples of iron and steel articles which have been Parkerized—in connection with this, a small aerated water testing outfit in operation. In attendance: R. C. Bristol, C. H. Awkerman, G. E. Luke, J. W. Sweet, M. Green, D. J. Neville, D. W. Crabbs.

Peninsular Steel Co., Detroit. Booth 481.
The oldest existing purchase order issued to Soderfors Steel Works in the year 1288; pictures of the different works in Sweden; a number of steel samples as the steel is now delivered; photomicrographs showing the distinction between the different steels, together with hardening and tempering curves; annealed tool steel which is free from surface decarburization; magnet steel with hysteresis curves. In attendance: Hugo Kurtz, Harry Kurtz, Walter O. Kurtz, Walter R. Flannery, K. Engelsted.

Henry Pels & Co., Inc., New York. Booth 233.
See illustration on page 629. In attendance: Ingo Maddaus, E. E. Tailfer.

Pittsburgh Instrument & Machine Co., Pittsburgh. Booth 446A.
Brinell hardness testing machines for hand and motor power; Brinell microscope for hand and motor power, with illuminator; Brinell depth gage impact testing machine, metallographic grinder. In attendance: Charles Trueg.

Pittsburgh Crucible Steel Co., Pittsburgh. Booth 418A.
Various alloy and tool steels. In attendance: K. E. Porter and others.

Pilbrico Jointless Firebrick Co., Chicago. Booth 442.
Jointless Pilbrico furnace lining, a plastic lining which is used in place of laid-up brick. It is installed while plastic with a mallet and then baked out by the heat of the furnace to give a long-lived one-piece jointless re-

New Haven Chapter

W. Paul Eddy, Jr., Geometric Tool Co., Chairman

W. C. Aurand, R. Wallace & Sons Mfg. Co., Treasurer

Washington-Baltimore Chapter

Emil Gathmann, Gathmann Engineering Co., Chairman

G. W. Quick, Bureau of Standards, Vice-Chairman

H. K. Herschman, Bureau of Standards, Secretary-Treasurer

Southern Tier Group

Frank W. Taft, Binghamton, N. Y. Chairman

Walter H. Ogden, Binghamton, N. Y. Secretary-Treasurer

Worcester Chapter

Robert E. Bigelow,
George F. Blake, Jr., & Co., Chairman

E. A. Copeland,
Samuel Winslow Skate Mfg. Co., Vice-Chairman

Carl G. Johnson
Worcester Polytechnic Institute, Secretary-Treasurer

fractory wall. In attendance: Frank S. Rieder and others.

Potter & Johnston Machine Co., Pawtucket, R. I. Booth 222.
One 5-D automatic chucking and turning machine; one 6-DP platen type automatic chucking and turning machine. In attendance: Norman R. Earle, G. Tell Du Bois.

Pratt & Whitney Co., Hartford, Conn. Booths 393-393A.
Small tools, such as taps, dies, reamers, cutters, hobs, etc.; precision gages; supermicrometer; method used for inspecting precision gage blocks for flatness. In attendance: Clayton R. Burt, Charles M. Pond, A. H. d'Arcambal, H. W. Kopf, H. H. Wilbraham, E. C. Godfrey, W. H. Gourlie.

W. L. Procunier, Chicago. Booth 388.
Tapping attachments, both friction and positive drive; safety tapping chucks; tap holders; bench tapping machines, friction and positive drive; tapping attachments, quick change; quick change chucks and collets; stud setting devices. In attendance: H. G. Procunier.

Production Machine Co., Greenfield, Mass. Booth 263A.
Production polishing and finishing machines as follows: Type A, with patent centerless belt feed; type R, general utility machine; type S, junior centerless polishing and finishing machine; surfacer; screw plates; taps; dies. In attendance: William S. Howe, Arthur H. Behnke, Leon Kinsman.

Pyrometer Instrument Co., New York. Booth 347.
Pyro radiation pyrometers—standard double range—(1) 1000/1800 and 1400/2600 deg. Fahr.; (2) 1400/2400 and 2200/3600 deg. Fahr.; Pyro insertion pyrometers—gradated 200/500 deg. Fahr.; Pyro optical pyrometers. In attendance: E. R. Wilner, F. Heidorn.

Rail Joint Co., New York. Booth 122E.
Rail joints, including continuous joints and special plates, for welding; reinforced 100 per cent mechanical joints. In attendance: Victor C. Armstrong, Edward A. Condit, Jr., Clarkson A. Disbrow.

Reeves Pulley Co., Columbus, Ind. Booth 361.
See illustration on page 622. In attendance: C. M. Reeves, C. B. Mott, R. H. McLean, R. E. Hill.

Republic Flow Meters Co., Chicago. See illustration on page 628.

Stanley P. Rockwell Co., Hartford, Conn. Booth 317.
A laboratory model, for the determination of critical points in steel or for measurement of thermal expansion; standard production type electric furnace 10 in. diameter by 16 in. deep equipped with the Rockwell Dilatometer for heat treatment of tools, dies, gears, etc., by the Volcrit method, a recent development of the Rockwell Dilatometer in which the Dilatometer may be connected to a furnace used for the heat-treatment of large castings or forgings and where the Dilatometer is situated some distance from the furnace itself. In attendance: Stanley P. Rockwell, Warren D. Fuller, Raymond W. Woodward, Kenneth Stumpf.

W. S. Rockwell Co., New York. Booth 157.
Photographs and catalogs of furnaces. In attendance: R. M. Atwater, H. N. Voltmann, C. P. Cogswell.

John A. Roebling's Sons Co., Trenton, N. J. Booths 173-175.
Different kinds of gas and electric welding wire; two miniature railroad shops in operation. In attendance: R. R. Newell, G. W. Swan, E. M. Dixon, E. King, A. E. Gaynor, E. T. Wert, F. J. Maple.

Roessler & Hasslacher Chemical Co., New York. Booth 485.
Cyanide mixtures, cyanides, chemicals for heat treating and electroplating. In attendance: W. M. Gager, C. H. Proctor.

Rotor Air Tool Co., Cleveland. Booth 140.
See illustrations on pages 628 and 629. In attendance: H. P. Bailey, K. L. Pohlman, C. S. Stilwell, C. B. Hunt, C. W. Campbell, E. C. Wilson, J. F. Slavik, M. B. Johnson.

Rollway Bearing Co., Inc., Syracuse, N. Y. Booth 272.
Complete line of products, including some of the large units company is now manufacturing for roll neck service in the steel industry; a number of special types of bearings developed for use in various types of cranes, motors, etc.; some of the bearings for use in annealing ovens for very high temperature service; crane hook bearings and a line of heavy duty pillow blocks recently put on the market. In attendance: C. A. Call, Mr. Wright, Samuel Farrell.

Rochester Chapter

George C. Van Vechten,
Stecher Lithography Co., Chairman

I. C. Matthews,
Eastman Kodak Co., Secretary-Treasurer

Rummins & Murray, Inc., Detroit. Booth 338A.
Machine tools, gages and appliances made by the following concerns: Standard Gage Co., Wetmore Reamer Co., West and Dodge Thread Gage Co., Charles L. Jarvis Co. In attendance: E. D. Rummins, J. K. Murray, Erik, Aldeborgh, W. E. Richie, M. N. Jarvis, R. G. Low, Ed. Johnson.

Seneca Falls Machine Co., Seneca Falls, N. Y. Booth 232.
Seneca Falls turning equipment; semi-automatic Loswing; the model R automatic lathe; Short Cut production lathes; Start screw-cutting engine lathes. In attendance: E. R. Smith, J. A. Fyfe, W. H. Nettle, John A. Camm, F. B. Webb, M. C. Day.

Sentry Co., Taunton, Mass. Booth 135.
See illustration on page 634. In attendance: Edwin I. Hope, P. B. Crocker.

Shenango-Peninsular Mold Co., Pittsburgh. Booth 291A.
Ingot molds and cast bushings. In attendance: H. S. Bradley.

George Scherr Co., Inc., New York. Booth 256.
In attendance: F. Konig and others.

Shawinigan Products Corporation, New York. Booth 124B.
Samples of Shawinigan calcium carbide in various commercial sizes; also empty sample drums showing various types and sizes of packages. In attendance: Henry Booth, A. F. Wall, W. P. Chur.

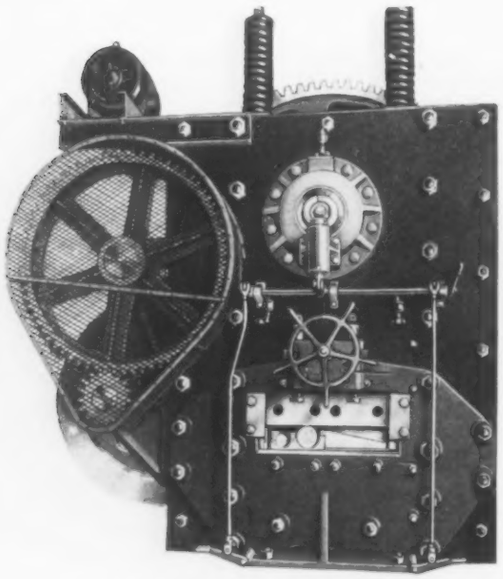
Shore Instrument & Mfg. Co., Jamaica, N. Y. Booth 447.
Shore D scleroscope, recording type; Shore C-2 model scleroscope, bulb type; Shore C-1 model scleroscope, bulb type; Shore Pyroscope A and B type, optical pyrometer; Durometer, an instrument for indicating the hardness of rubber; Elastometer, an instrument for indicating the elasticity of rubber; Localcase, a compound in powder form for controlling the case in carburizing;

Toronto Chapter

W. O. Oliver,
Steel Co. of Canada, Vice-Chairman

Campbell Bradshaw,
McLean Technical Papers, Secretary

Exhibits at Steel Treaters' Meeting in Detroit



Buffalo "Armor Plate" Billet Shear

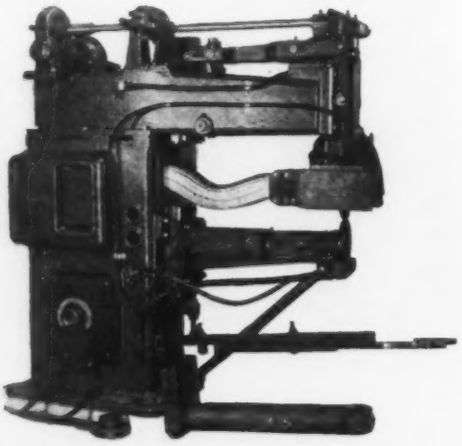
THE BUFFALO FORGE CO., Buffalo, will show its No. 14 "Armor Plate" billet shear (above), an intermediate size in the series of 10 of such machines made by this company. This machine is designed to cut 6½-in. rounds, 6-in. squares and 16 x 2½-in. flats without heating. Additional knives can be furnished for different shapes and sizes. The rated capacity is based on mild steel with a tensile strength of 65,000 lb. per sq. in. All gears are of steel, machine cut; bearings are bronze bushed, and the flywheel bearing is ring-oiling. The flywheel is of sufficient strength, it is stated, to avoid undue shock to the motor, which is direct connected. The machine is engaged by a jaw clutch operated by hand or foot trips.

Heavy-Duty Electrically Operated Grinder

A HEAVY-DUTY electrically driven grinder, illustrated above, recently added to the line of similar equipment of the Standard Electrical Tool Co., Cincinnati, will be exhibited. The machine is available in three sizes, 5, 7½ and 10 hp. capacity, respectively. Features include General Electric motors with push-button control, SKF deep-groove ball bearings to support spindle, and a locking device to hold shaft when changing wheels. Emery wheel guards are hinge-door type, with exhaust connections. Each guard is fitted with a spark breaker as well as polished, wired, glass eye shield.

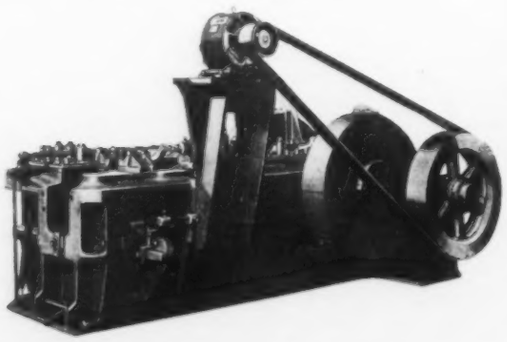
Mercury Vapor Lamps for Sheet Metal Plants

THE COOPER HEWITT ELECTRIC CO., Hoboken, N. J., will display its Mercury vapor lamp, especially designed for use in sheet metal plants. The illustration at right shows an installation in the plant of the Follansbee Brothers Co., where its use, it is stated, greatly facilitates the discovery of metal defects. More than fifty of the company's lamps will be installed in sections devoted to operating exhibits, demonstrating their use in making machine operations and inspection work easier.



New Thomson Welding Machines

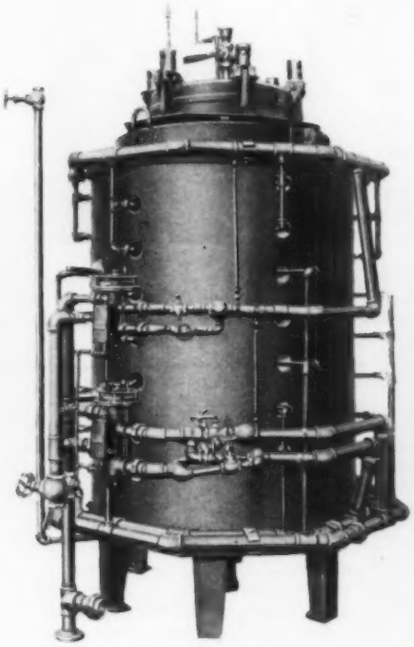
FOUR new welding machines will be exhibited in Space 125 by Thomson Electric Welding Co., Lynn, Mass., of which the No. 375 double roller seam welder is illustrated above. It will handle steel sheet from No. 22 gage to ⅛ in., by change gears giving speeds of 6, 9, 12 and 15 ft. per min., and 15 points of electrical current regulation. The minimum diameter of cylinder that will slip over the lower horn is 8 in. Two lower horns are furnished with rollers at right angles; the upper roller head may be turned correspondingly. All copper parts—transformer secondary horns, rollers and roller shafts—are water cooled, and all bearings have Alemite lubrication.



Ajax New Model Upsetting Forging Machine

A NEW model Ajax 1½-in. upsetting forging machine will be in operation at the booth of the Ajax Mfg. Co., Cleveland. It is illustrated above. Five different kinds of forging operations, namely, upsetting, flattening, punching, swaging and bending will be demonstrated. Steel bars used will be heated in an electric furnace supplied by the American Car & Foundry Co.

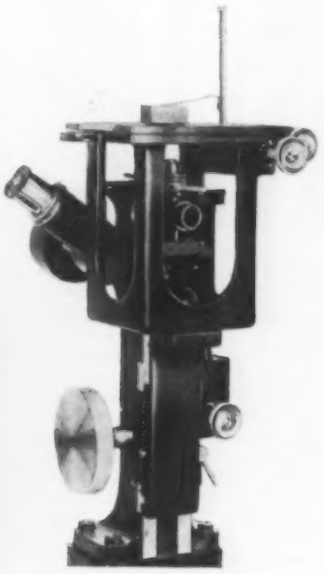
Exhibits at Steel Treaters' Meeting in Detroit



Surface Hardening Furnace by Nitrogenizing Process

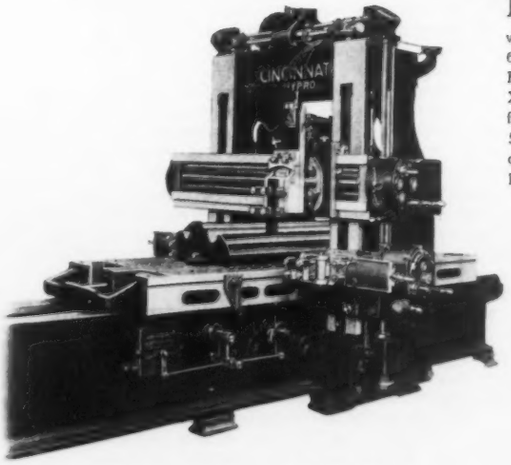
ONE of the features of the large exhibit of the American Gas Furnace Co., Elizabeth, N. J., is a vertical retort cylindrical furnace for surface hardening steel by the new nitrogenizing process. The furnace, as shown by the illustration, will be in operation. The company will also show a new furnace for brass melting of the rotary retort type and an improved rotary retort furnace for temper drawing.

IN addition to high-speed precision internal grinder spindles, one of which is an air spindle revolving at 65,000 r.p.m., the Ex-Cell-O Tool & Mfg. Co., will display its line of XLO standard drill jig bushings. A feature will be bushings for a No. 52 drill which is 0.635 in. in diameter, the smallest hole previously ground being 3/32 in. in diameter.



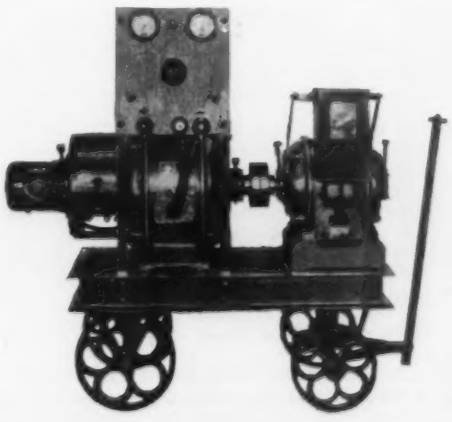
Bausch & Lomb Microscope

THE Bausch & Lomb Optical Co., Rochester, N. Y., has developed the new microscope shown above, which it is claimed entirely overcomes difficulties in obtaining satisfactory photomicrographs at high magnifications such as vibration and change of focus during exposure due to expansion of materials under heat from the illuminant.

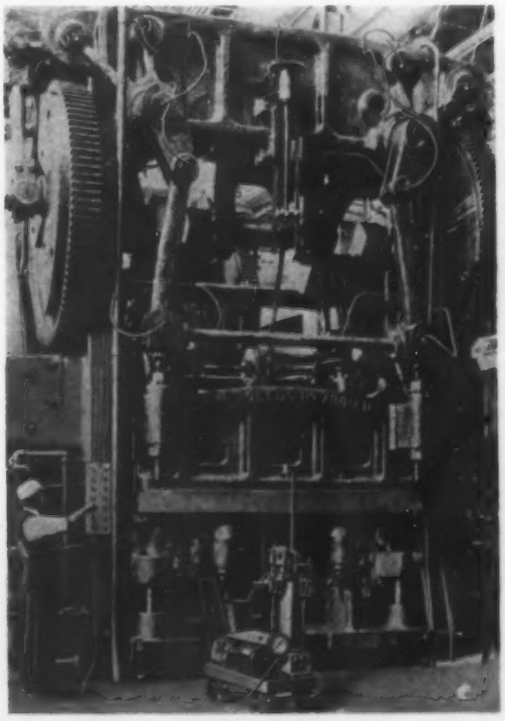


Planer for Irregular Outlines

IN the machine illustrated above the Cincinnati Planer Co., Cincinnati, is said to have developed an entirely new method for planing an irregular outline accurately. The template fastened to the rail back of the slide is a piece of 1-16-in. sheet brass and serves as a master. The small attachment back of the slide is the carrier for the tracer. This tracer does not sustain the weight of the slide or the cutting of the tool, but merely makes a contact. This contact actuates an electrical mechanism of Keller Mechanical Engineering Corporation design that controls the movement of tool to follow the outline of template.



A 300-400 ampere portable Hausen arc welder will be exhibited by the Northwestern Mfg. Co., Milwaukee. This is direct connected to a 20-hp. motor. Mounted on the motor is a starter, providing no voltage and overload protection as well as overload release reset. Connected to the frame is a switchboard and rheostat for the welding generator.



AMONG the lubricating devices which the J. N. Fauver Co., Inc., Detroit, will show is its method of centralising lubrication on such machinery as is shown in the illustration, a Toledo heavy-duty press. It formerly required four men 1 hr. 20 min. to lubricate this press, and at considerable hazard, but with the central lubrication system, the workings of which are shown in the photograph, the work is done by one man, it is stated, in 7 min. without risk to life or limb.

Notre Dame Group

R. C. Spencer,
Dept. of Chemistry, Notre Dame University, Chairman

Frank J. Mootz,
Republic Creosoting Co., Indianapolis, Secretary

Ernest J. Wilhelm
Treasurer

Springfield Chapter

J. W. Juppenlatz,
Chapman Valve Mfg. Co., Chairman

E. L. Woods,
Springfield Gas Light Co., Secretary-Treasurer

Localhard, a compound in powder form for controlling the hardness of tool steels in quenching. Shore universal C-D model hardness indicator is new. It has two indicator dials, one indicates pressure in kilograms and pounds, the other indicates indentation in 0.0002 in. In attendance: F. G. Kendall and assistants.

Simonds Saw & Steel Co., Fitchburg, Mass. Booth 373.
Metal cutting saws, circular and band; files, hacksaw blades, machine knives, tool steel, magnet steel, special analysis steel. In attendance: H. B. McDonald, George R. Bird, C. R. Pafenbach.

Skinner Chuck Co., New Britain, Conn. Booth 386.
Skinner two and three-jaw, air-operated chucks of the adjustable and non-adjustable types. One of these chucks is mounted on a small lathe with Skinner air grip air cylinder and full equipment necessary for its operation. A full line of Skinner hand-operated chucks are cut in sections to show their construction. The very latest type of heavy duty Skinner independent and universal scroll chucks built to meet today's production requirements shown. In attendance: K. H. Walther.

Sleeper & Hartley, Inc., Worcester, Mass. Booth 243.
Standard No. 2 universal coilers, such as are used by spring makers. In attendance: P. E. Mignacca.

Southern Manganese Steel Co., St. Louis. Booth 400.
See illustration on page 635. In attendance: E. F. Mitchell, D. M. Powers, E. M. Porter, Dr. F. A. Fahrenwald.

Spencer Turbine Co., Hartford, Conn. Booth 112.
Spencer turbo-compressor for supplying air for oil and gas burning industrial furnaces, including catalog No. 1515, capacity 1350 cu. ft. per min., 1½ lb. pressure; catalog 1505, capacity 450 cu. ft. per min., 1 lb. pressure; catalog No. 1505, capacity 450 cu. ft. per min., 1 lb. pressure; catalog No. 1001, capacity 125 cu. ft. per min., 1 lb. naces on exhibit. The machines are equipped with special ball bearing motors using ball bearings of much larger than the usual size. In attendance: S. E. Phillips, H. M. Grossman, R. B. Richardson.

Standard Electrical Tool Co., Cincinnati. Booth 215.
See illustration on page 638. In attendance: G. H. Feltes, C. C. McGill, R. C. Feltes.

Standard Fuel Engineering Co., Detroit. Booth 118.
Oil tempering furnace with atmospheric burner and thermostatic temperature control; No. 425-gas fired high speed steel hardening furnace; No. 315-gas fired high carbon steel furnace; No. 0540-gas fired lead and cyanide furnace. In attendance: George H. Willett, John A. Willett, Hosmer M. Lathrop, E. P. Beeman.

Standard Tool Co., Cleveland. Booth 484.
Twist drills, reamers, milling cutters, taps. In attendance: M. A. Jackson, J. G. Green.

L. S. Starrett Co., Athol, Mass. Booth 249A.
A display of fine mechanical tools, including a number of new tools that have been recently placed on the market; hacksaw blades; steel tapes, etc. In attendance: O. H. Leidy, B. L. Webb, F. A. Ball, D. Findlay, A. H. Starrett.

Standard Gage Co., Inc., Poughkeepsie, N. Y. Booth 238A.
A complete line of Johansson gage blocks, product of Ford Motor Co., and precision gages. In attendance: Erik Aldeborgh, W. E. Richie.

Standard Oil Co. of Indiana, Chicago. Booth 242.
Lubricating and cutting oils. In attendance: N. H. Reed and others.

Standard Steel & Bearings, Inc., Plainville, Conn. Booth 387.
Several aircraft engines of well-known types in which company's product is used; samples of ball bearings under various stages of manufacture. In attendance: W. H. Hill, L. A. Cummings, A. E. Fawley, G. C. Warner, B. J. Shallow, E. J. McAvay.

N. A. Strand Co., Chicago. Booth 386.
Flexible shaft grinding and polishing machines; rotary filing machine; auto body refinishing machine; and large variety of attachments for use on flexible shaft machines. In attendance: Clyde W. Blakeslee, N. A. Strand.

Steel City Testing Laboratory, Detroit. Booth 344.
Style A, standard Brinell hand-operated machine, 6½-in. gap; style A-1, standard Brinell hand-operated machine, 12½-in. gap; type O-3 power-operated Brinell hardness testing machine for production testing; type P portable hardness testing hammer; SKW adapter for use with the Shore scleroscope instrument; SC dead weight testing machine, Brinell; DD direct reading Brinell machine; type N machine for testing thin sheets; type R-2 ductility testing machine for sheet metal, etc.; universal testing machine; type OM Brinell microscope; type OM-18 illuminated Brinell microscope; latest type checking scale for checking Brinell microscopes. In attendance: H. A. Weaver, Messrs. Nass and French.

D. A. Stuart & Co., Chicago. Booth 342.
Sample parts, selected from the more difficult operations, machined or treated with the following metal working oils: Super-Kool base oil; Thred-Kut bolt threading oil; Thred-Kut No. 10-broaching oil; Kleen-Kut soluble oil; Dasco No. A-tempering oil; Dasco No. 34-soluble quenching oil; Codol liquid grinding compound. In attendance: Charles A. Day, Tracy D. Langdon, William H. Oldacre, W. F. Farlowe, C. H. Baker.

Square D Co., Detroit. Booth 345A.
Square D magnetic switch with push button control, permitting either hand or automatic reset; Square D convertible power panel, permitting the use of either 30, 60 or 100 ampere fuses in any of the circuits; Square D industrial safety switches; Square D tester which indicates voltage, whether current is a.c. or d.c., locates open circuits, blown fuses and motors running single phase. In attendance: A. A. Schueler, C. E. Cook, C. L. Hull, K. H. Bronson.

Strong, Carlisle & Hammond Co., Cleveland. Booth 155.
S, C and H high-speed furnace; S, C and H electric-babbitt melting furnace; S, C and H electric lead-hardening furnace; S, C and H continuous-annealing furnace. In attendance: J. Weintz, G. S. Peterson, A. B. Lindsay.

Sullivan Machinery Co., Chicago. Booth North Woodward Annex.
A Sullivan air compressor and a Sullivan gas compressor. The gas compressor is a Sullivan 8 x 6, WG-6 pattern, equipped with special regulating devices. It is operating on 10 lb. of gas pressure, and is electrically driven. The air compressor consists of a Sullivan WL-22, 120-ft. direct connected unit, the two cylinders being single acting and of the vertical type. In attendance: W. H. Duffill.

Swedish Crucible Steel Co., Detroit. Booth 364.
Nickel-chromium alloy carbonizing boxes and covers, nickel-chromium alloy rails, furnace parts, retorts, etc., crucible steel cyanide and lead pots, steel carbonizing boxes and covers. In attendance: H. K. Nixon, L. W. Hottel, S. R. Allen, J. Kauffman.

Swedish Charcoal Steels, Inc., New York. Booth 381.
Samples of Swedish tool steels showing fracture, Swedish ores, Swedish charcoals, pig iron, slag, etc. In attendance: S. F. Wollmar, H. C. Moore.

Surface Combustion Co., New York City. Booth North Woodward Annex.
A continuous furnace of the roller hearth type, gas-fired with automatic temperature, automatic combustion con-

trol for reheating or heat treating operations; a new type of heat treating oven furnace, with temperature control; high-speed furnace; also a display of standard line of heat treating and melting furnaces. In attendance: F. W. Manker, C. B. Phillips, H. M. Heyn, A. L. Hollinger.

Taylor Instrument Companies, Rochester, N. Y. Booth 326A.
A full line of temperature instruments, including a complete selection of electrical pyrometer equipment, and accessories; thermometers, high and low temperature automatic oven and furnace controllers, recording thermometers and pyrometers, thermopyres, thermocouples, etc. In attendance: G. A. Howell, H. A. Irving, H. A. Hohes.

Tate-Jones & Co., Inc., Leetsdale, Pa. Booth 119.
Gas, oil and combination gas and oil burners, small general hardening furnace, blast gates and duplex oil strainers. In attendance: K. T. Davis, E. O. Mueller, P. J. Myall, W. H. Scheib.

Taylor Winfield Corporation, Warren, Ohio. Booth 170.
Electric welding machines. In attendance: A. C. Taylor, W. A. Jones.

Thomson Electric Welding Co., Lynn, Mass. Booth 125.
See illustration on page 638. In attendance: H. B. Warren, W. T. Ober, James A. Muir, C. E. Seifert, R. B. Strout.

Henry G. Thompson & Son Co., New Haven, Conn. Booth 252.
A new and improved fast speed spring temper metal cutting band saw used for cutting sheet metals, etc., at the rate of 12,000 to 14,000 ft. per min.; a full line of Milford and Mil Flex hacksaw blades; flexible back metal cutting band saws and the new Mi Hy high-speed hacksaw blades. In attendance: Fellowes Thompson, Thomas A. Hyde, H. B. Norris.

Macleod Co., Cincinnati. Booth 241.
Electric butt welder, sand blast cabinet, new design of sand blast machine, paint sprayer outfit, and smaller sprayer. In attendance: James Lauder, Walter Macleod.

Shenango-Penn Mold Co., Dover, Ohio. Booth 391A.
Centrifugally cast bronze in various diameters and lengths made of standard and special compositions in the rough, semi-finished and finished states. The specimens vary in weight for each piece from 1lb. to 1000 lb. or more and are in the form of solids, tubes, bushings, sleeves and liners. In attendance: H. S. Bradley, G. L. Collard, F. A. Demms, H. M. Wilson, J. P. Jefferis, Rafford Pitt, C. M. Bliss, P. H. Jefferis.

Timken Roller Bearing Co., Canton, Ohio. Booth 420.
Photographs of plant and various operations, with a few samples of bearings. In attendance: M. T. Lothrop, A. J. Sanford, C. A. Swan, Robert Atkinson, S. D. Williams, Thomas W. Hardy, John E. Fick.

Tomkins-Johnson Co., Jackson, Mich. Booth 307.
Die sinking milling cutters, one universal work stand and various chucks and cylinders, samples of blanking dies and forming dies, a 10-in. 3-jaw chuck and air cylinder. In attendance: H. A. Tompkins, G. F. Hopkins, A. R. Johnson, R. B. McDonald, A. C. Haberkorn.

Torchweld Equipment Co., Chicago. Booth 129.
Torchweld products, as follows: non-flash gas welding units, non-flash hand welding torches, machine welding torches, gas cutting units, hand cutting torches, machine cutting torches, lead welding units and sheet metal welding units; decarbonizing units, preheating torches, gas pressure regulators, acetylene generators, cylinder manifolds, automatic welding and cutting machines, welding rods and wire, welding and cutting hose, welding fluxes, accessories and supplies. In attendance: W. A. Slack, Russell Smith, Harvey G. Larisch, Albert W. Fry.

Transue & Williams Steel Forging Co., Alliance, Ohio. Booth 488.
Miscellaneous forgings and stampings, together with special exhibit of grain flows in forgings. In attendance: F. W. Trabold, R. C. Yates, L. D. Keplinger, F. A. Zeller, J. A. Saylor, R. L. Pointer, L. D. Rockwell W. T. Cullen.

Tuffley Burner Corporation, Syracuse, N. Y. Booth 136A.
The Tuffley burner in operation in a furnace. This burner uses low pressure air (10 oz. and up) and will burn gas, gas house tar, tar oils, crank case oil and any grade of fuel oil down to 14 deg. Baume. In attendance: G. I. McDermott, S. M. Michael.

Tuthill Pump Co., Chicago. Booth 268.
Model OB motor-drive pump was primarily brought out for oil burner service, but has been very successfully used in a number of installations for pumping lubricating oil to bearings; No. 3 Model M pump, motor-drive, is designed to pump liquids at low pressure in a service where automatic relieving is desired; No. 6 Model M motor-drive pump is the same type as the No. 3M, but of larger capacity, pumping 50 gal. per min. at 1200 r.p.m. In attendance: G. I. McDermott, S. M. Michael.

Union Drawn Steel Co., Beaver Falls, Pa. Booth 452.
A display of cold drawn steel in rounds, flats, squares, hexagons, special shapes; screw machine products made from cold drawn steel; cold drawn elevator guides, and finished crankshafts. In attendance: E. S. Hoopes, George B. Mitchell, L. E. Creighton, C. H. Beegle, B. H. Elliott, L. H. Carlisle, George L. Anderson, F. C. Young. J. D. Armour, E. A. Griffiths, R. G. Merchant, W. A. Van Wicklen, J. M. Johnston, J. A. Quay.

Unishear Co., Inc., New York. Booth 270.
Complete line of Unishear. In attendance: Max Carsen, Tom H. Collard, H. J. Heller, U. Steindorff.

Universal Steel Co., Bridgeville, Pa. Booth 385A.
Sheets of carbon and alloy steels, showing hacksaw, gin saw, hand saw, circular saw, cutlery, magnet, high-speed agricultural disk and soft center steels; bars of carbon, alloy and high-speed tool steels, ball race magnet, file, and valve steels; sheets and bars of heat resisting and non-corrosive steels and alloys; cold drawn bars and cold rolled sheets; finished products made from the foregoing. In attendance: J. O. Rinek, W. G. Miller, Frank Garratt, Frank Saltsman, H. M. German, H. C. Copp, Jr., Charles Evans, Charles Ridgeway, A. F. McFarland.

Una Welding & Bonding Co., Cleveland. Booth 126B.
A complete line of welding machines for both a.c. and d.c. circuits, also complete line of welding rods, including bare and coated rods. In attendance: C. L. Bennett.

University of Michigan, Ann Arbor, Mich. Booths 376 and 378.
Photographs, charts and samples.

Vanadium-Alloys Steel Co., Latrobe, Pa. Booths 311-330.
Hot and cold die tools made from various brands of steel special tools used by customers, samples of cold drawn steel and files, various high speed, alloy, and carbon tools, heat treated, fractured samples of various brands of steel. In attendance: Roy C. McKenna, Floyd Rose, R. R. Artz, W. D. Fisher, T. W. Schein, W. R. Mau, H. P. Edison, M. W. Caruthers.

Victor-Peninsular Co., Detroit. Booth 380.
Heat treated, cold headed cap-screws and special bolts of S.A.E. 1035, 3135 and 1355 steels; bent wire products; also continuous heat treating furnaces which the company has designed and built. In attendance: T. S. Higbee, Harold Stark, Fred Ladd, H. E. Moblo.

Vulcan Crucible Steel Co., Aliquippa, Pa. Booth 387A.
High-speed, alloy, and carbon tool steels, and special steels. In attendance: S. G. Stafford, R. M. Kelso, A. D. Beeken, Jr., S. A. Stafford, W. H. Norris, L. D. Sullivan, E. H. Lurker, A. Hartel, Jr.

Charles H. Junge,
Case School of Applied Science, Chairman, Case Group

M. E. Greenhow,
Chairman, Milwaukee Chapter

Swan Hillman,
National Lock Co., Chairman, Rockford, Ill., Chapter

Thomas Wray,
Washburn Wire Co., Chairman, Rhode Island Chapter

J. J. Dierbeck,
International Harvester Co., Vice-Chairman, Milwaukee Chapter

C. S. McFarland,
Chairman, Columbus Group

V & O Press Co., Hudson, N. Y. Booth 263.
One No. 5 geared V & O inclinable press equipped with King pressure toggle. The press is fitted with a punch and die for performing a drawing operation. In attendance: H. U. Herrick, F. A. Beardsley, H. F. Zorn.

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Booth 217-219.
See illustrations on page 623. In attendance: G. R. Lamb, W. A. Spear, J. M. Schaeffer, F. S. Van Valkenburg, G. W. Jackman, S. Hallaway, C. Scuillo.

Wall Brothers Co., Detroit. Booth 124B.
Samples of Shawinigan calcium carbide in various commercial sizes; also empty sample drums showing various types and sizes of packages. In attendance: Howard Guthrie.

Wave Cut File & Tool Corporation, New York. Booth 303.
The Wave Cut file which on account of its wave makes the file self-cleaning and non-clogging on any material with the exception of lead babbitt. In attendance: Conrad Pasch, Walter S. Ryan.

Weldit Acetylene Co., Detroit. Booth 151.
Welding torches, cutting torches, oxygen and acetylene regulators, decarbonizing equipment, supplementary parts. In attendance: O. S. Smith, W. E. Massey, J. B. Manor, J. W. Keyes, J. S. Westbrook, J. McManus, M. Gallo, D. Ditler, D. Haselton.

Westinghouse Electric & Mfg. Co., East Pittsburgh. Booths 123-144.
Electric furnaces of latest design, electric arc welding machines, frequency changers for machine tool operation, small, high frequency drill motors. In attendance: W. W. Reddie, F. B. Harvey, A. M. Candy, Edwin Fleischmann, D. H. Byerly, C. L. Wilson, G. H. Haynes, T. C. Kelley, M. R. Armstrong, J. C. Woodson.

Wheelock, Lovejoy & Co., Inc., Cambridge, Mass. Booth 418A.
Hy-Ten alloy machinery steels; Whelco tool steels in their application to special parts. In attendance: A. Oram Fulton, F. H. Lovejoy, H. M. Foster, E. C. Bartlett, G. A. Baron, M. M. Allison, C. R. Jenks, L. P. Needham.

West & Dodge Thread Gage Co., Boston. Booth 238A.
A complete line of thread and spline gages. In attendance: R. G. Low.

Wetmore Reamer Co., Milwaukee. Booth 238A.
A line of adjustable blade production reamers. In attendance: Ed. Johnson.

Wickwire Spencer Steel Co., Inc., New York. Booth 130B.
Welding wire. In attendance: Roger H. Clapp, H. D. Miller.

Edwin L. Wiegand Co., Pittsburgh. Booth 307.
A complete line of Chromalox products, such as strip heaters, space heaters, immersion units, complete electric heaters, automatic electric water heaters, etc. In attendance: Ernest N. Calhoun, Walter G. Heacock.

Whitman Barnes Detroit Corporation, Detroit. Booth 325.
Complete line of twist drills, reamers, milling cutters, end and hollow mills, counterbores, center points and holders. In attendance: R. Hammersley, H. Z. Callender, A. B. Hall, F. J. Smith, H. J. Lincoln.

Whitney Mfg. Co., Hartford, Conn. Booth 486.
A series of Whitney chain drives driven by an electric motor. This arrangement of drives shows the application to varying degrees of speed of three distinct types of chain, namely, Whitney rolling joint type silent chain for high speeds, Whitney pin and bushing type silent chain for moderate speeds, and Whitney steel roller chain for low speeds. In attendance: R. A. Follensby, D. I. Wheeler, H. L. Ames, E. H. Huntington.

Whitney Metal Tool Co., Rockford, Ill. Booth 251.
Complete line of ball bearing punches and shears; angle iron roll, power driven. In attendance: Gus Jensen, John Jensen.

J. H. Williams & Co., Buffalo. Booth 366.
Williams' Agrippa tool holders, Vulcan clamps, lathe dogs and snap gages, drop-forged wrenches made of carbon steel; Super-Renches made of chrome-molybdenum steel. In attendance: J. C. Scanlon, A. S. Maxwell, A. C. Nuth, V. E. Nagle.

Wilson-Maeulen Co., Inc., New York. Booth 479.
Recording pyrometers, indicating pyrometers, automatic temperature controllers, electric resistance bulb thermometers, Rockwell hardness testers. In attendance: C. E. Hellenberg, M. A. Schreiner.

Witherow Steel Corporation, Detroit. Booth 300.
Rolled steel bars of variable section, including street railroad tie rods, steering tie rods for automobiles, rear axle shafts, front axles, third arm blanks, camshaft blanks, and gear shift levers. In attendance: W. P. Witherow, J. S. Langston, W. C. Emory, E. H. Vogel.

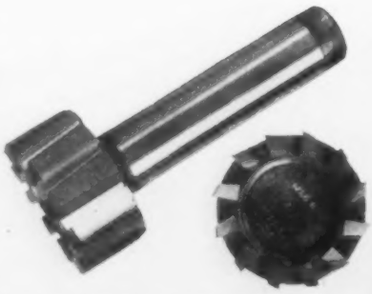
Young Brothers Co., Detroit. Booth 154 A.
Electric laboratory ovens, working models of continuous conveyor ovens, photographic display, and descriptive literature of various types of ovens. In attendance: George A. Young, R. B. Reed, C. G. Lisch, V. A. Fox.

Ziv Steel & Wire Co., Chicago. Booth 318-320.
Dies and tools made from the various brands of Ziv's steels as well as special tools and dies made from Darwin and Milner's Neor and Prk steels. In attendance: G. F. Ziv, A. Ziv, N. J. Hyslip, A. F. Brunck, R. J. Foley, H. F. Kluender, H. E. Ziv, V. F. J. Tlach.

Exhibits at Steel Treaters' Meeting in Detroit

Forged Type of Twist Drill

CONTRARY to its usual process, the Morse Twist Drill & Machine Co., New Bedford, Mass., has recently developed a forged type of drill which will be exhibited at Detroit. Tests have shown that it has increased production more than 50 per cent in some plants because of the greater number of grinds and the number of inches drilled per grind.

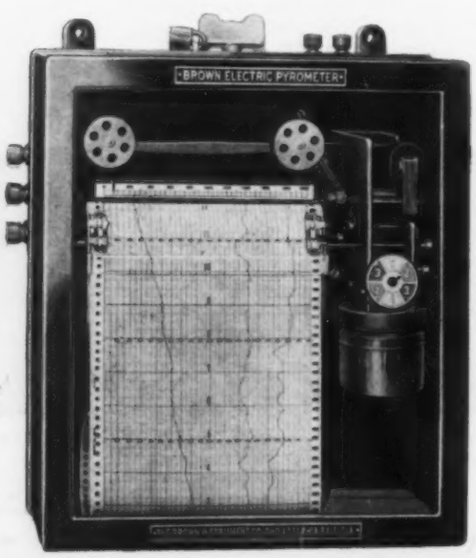


Multiple Reamer and Boring Tool

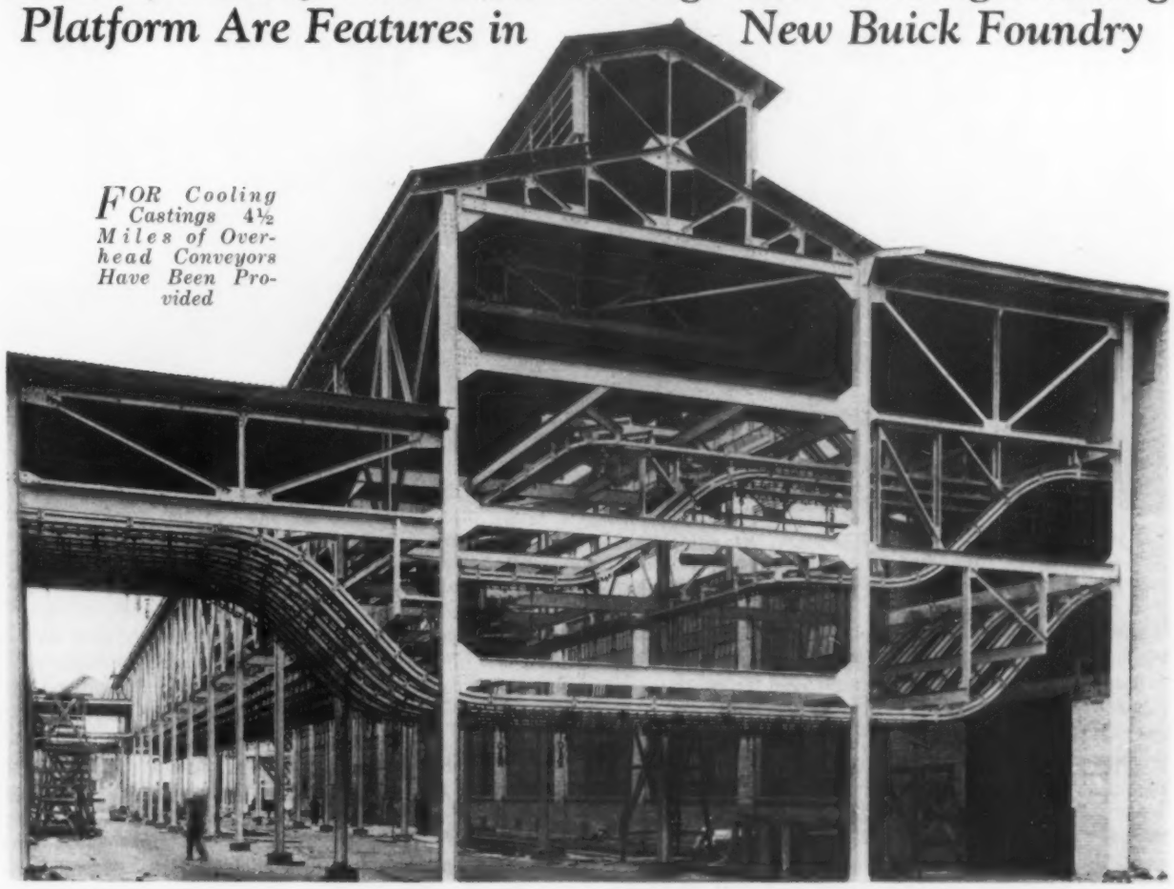
NEW small tool applications developed by the Gairing Tool Co., Detroit, will be featured in that company's exhibit. A multiple boring tool and a reamer, the latter illustrated above, which can be adapted to the Gairing standard drive shank, have blades which are held in the body by friction. A double angle causes the high-speed steel blade to tighten itself in place and have a bearing on all sides, thus making a rigid tool, and when the blades are driven in place it is practically a solid tool. Wide range of adjustment is attained, it is stated, by placing a shim in the slot at the bottom of the blade. When the outside diameter of the blade wears down, the shim brings the blade up on the diameter and out on the length. The bodies that hold the blades are made from Vanadium steel.

Visible Multiple Recording Pyrometer

A NEW type of visible multiple recording pyrometer has been devised by the Brown Instrument Co., Philadelphia. The new instrument will be on exhibition among many other similar products of this company and is reproduced below. The new instrument is a three record pyrometer and operates on the frictionless principle, whereby the recording pointer springs freely between records and the next consecutive temperature record is automatically switched on. Arrangements have been made so that the temperature record becomes more clearly visible to the observer.



Miles of Conveyors to Cool Castings and Moving Pouring Platform Are Features in New Buick Foundry



FOR Cooling Castings 4½ Miles of Overhead Conveyors Have Been Provided

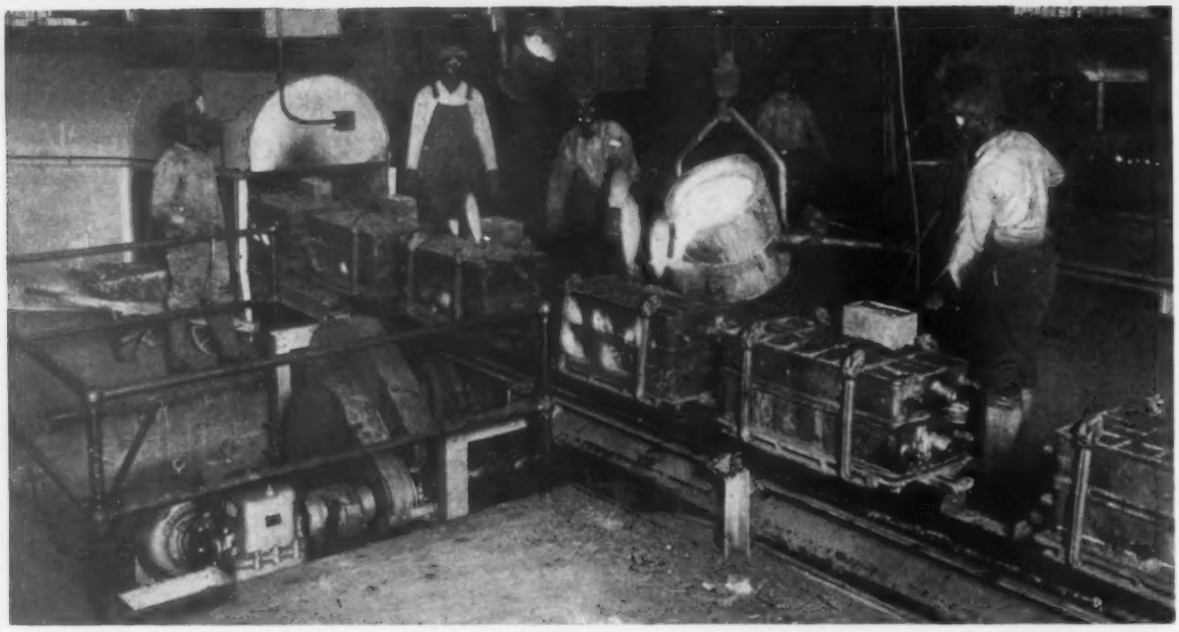
MECHANICAL conveying equipment of various standard and special types has replaced hand labor wherever possible in the new continuous gray iron foundry of the Buick Motor Co., Flint, Mich., which was recently placed in operation. With a capacity to pour 750 tons of iron in an 8½-hr. day, this is one of the largest foundries in the world. The plant is designed to provide a sufficient capacity to produce all the gray iron castings required for the Buick car.

Iron is melted in six 96-in. cupolas, which are charged mechanically. Mechanical handling equipment is also used in making up the charges. A coke elevator delivers coke directly from railroad cars into the cupola. The cupola doors are pneumatically operated. Electric hoists operating on monorails deliver the metal from the cupola to the molding floor in 1500-lb. ladles. From these it is poured mechanically into smaller ladles. The hand ladles are also moved mechanically except those used for pouring small molds. While pouring, the workmen stand on a platform that moves at the same speed as a conveyor carrying the molds.

After pouring, the mold conveyor delivers the flasks to the shakeout grates. From the pouring zone to the shakeout the conveyor is covered with a ventilating hood to prevent the heat and gases from the hot castings from escaping into the foundry.

A rather recent development in foundry arrangement is the provision of conveyors on which castings are cooled before being delivered from the shakeout grates to the cleaning room. The extent to which this provision for cooling castings has been carried is one

ASSEMBLED Cores Are Brought Into the Molding Room through an Entrance in the Distance and Travel on the Long Conveyors at Either Side. As they pass the molding benches, the cores are set and the molds assembled, then passing toward the foreground for pouring



POURING Is Done by Workmen Standing on a Moving Platform Which Keeps Pace with the Mold Conveyor. Immediately after pouring, the molds pass under the steel hood shown at the left, which prevents them from overheating the room and contaminating the atmosphere with gases

of the interesting features of the Buick plant. An overhead conveyor 4½ miles long is provided for this purpose, the castings being suspended from the conveyor. The conveyor, which doubles back on itself several times, is housed under a skeleton structure open on all sides to secure a free circulation of air. It takes 1½ hr. for the castings to pass the length of the conveyor, and, on reaching the discharge end, they have become cooled sufficiently to be handled by hand.

In the knockout room automatic air hammers loosen the sand remaining on the castings, and they go to the sand blast machines and tumbling mills. From the cleaning department an overhead conveyor carries the motor castings across the grounds to the engine plant. Smaller parts are stored in bins before removal by electric trucks.

An elaborate conveyor system is provided for handling cores. Cores when finished are placed on a conveyor, and on this they are carried through the core-baking ovens and on to the core assembly room without further handling. After assembly, other conveyors carry the cores to the foundry, where they pass on two long conveyor lines alongside the molding machines.

Improved equipment is provided for handling and preparing sand. Conveyors deliver the sand from a continuous sand mixer to the hoppers above the molding and core making machines. Sand from the shake-out grates falls to a conveyor that delivers it to a sand reclaiming machine, which reclaims both molding and core sand. Sand is stored in a steam-heated shed having a capacity for 1000 carloads.

The foundry building containing the cupolas, core room and pouring room is 123 x 657 ft., and the cleaning plant, 24 x 680 ft. In another building, 161 x 201 ft., are located the stock rooms, offices, dining rooms and a machine repair department for the maintenance of foundry equipment. There are several other buildings housing the knockout room, wiring department and various storage units. The foundry is designed to provide an abundance of light and good ventilation. It is ventilated by forced draft which keeps the air circulation constant.

European Engineers to Join Electrochemists on Trip Through Northwest

Among those who will travel with the American Electrochemical Society in its excursion through the Northwestern States will be I. J. Moltkehansen, consul honaire de France, and his associate, Leopold Herry, director generale of the Central Electrique of Flanders, and Dr. Konrad Teufel, a German zinc expert. Mr. Moltkehansen is known for his work on the production of zinc in the electric furnace, and Mr. Herry recently developed a new carbide acetylene process. The president of the society is Prof. S. C. Lind of the University of Minnesota, who developed the process for the extraction of radium from Colorado minerals.

The itinerary of the society includes stops at Butte, Anaconda and Great Falls, Mont., where the large copper works will be inspected. A day will be spent at Shelby, Mont., at the Kevin-Sunburst oil field. Two side trips will be taken into Canada, one at Vancouver and the other at Trail, B. C., where one of the most complete plants in the world for the production of pure lead, zinc and copper is located. At Burke, Idaho, the visitors will go down the Hecla shaft, 2000 ft. deep. The party will inspect the dam across the Mississippi River at Keokuk, Iowa, and the plant at the Snoqualmie Falls near Seattle.

British May Demand Designation of Country of Origin

WASHINGTON, Sept. 1.—Recommendation has been made by the merchandise marks advisory committee to the Board of Trade of the United Kingdom that imported wire netting, woven wire, and mill bobbins should bear an indication of the country of origin, according to a cablegram received by the Department of Commerce from Acting Commercial Attache Hugh D. Butler, London. The approval of the Board of Trade is required before executive action on the recommendation can be taken.

(According to cabled information, THE IRON AGE, July 21, page 154, iron and steel plates, sheets, flats, hoops, strip steel, rails, beams, channels and bars were recommended by the committee for marking.)

Refractories Meeting Postponed

The fall meeting of the American Refractories Institute, scheduled originally for Sept. 15, at the Clifton Hotel, Niagara Falls, Canada, has been postponed and will be combined with the winter meeting, which is to be in conjunction with that of the American Institute of Chemical Engineers in St. Louis, Dec. 6, Dorothy A. Texter, secretary, announces.

Prerequisites of Successful Polishing

Glue the Most Important Element, with the Abrasive Grain Second—Care in Preceding Processes Saves Much Otherwise Wasted Cost

BY BRADFORD H. DIVINE*

STRICTLY speaking, the term "polishing" should be applied only to those operations which produce luster. As a matter of fact, in the industry it is applied to three distinct processes—flexible grinding, polishing and buffing. Polishing, to use the term correctly, is the process employed where luster only is desired, usually following flexible grinding. Both flexible grinding and polishing processes employ flexible wheels with abrasives glued to them, while buffing wheels are impregnated with buffing compositions as the abrasives.

Polishing is one of the things which have developed from the experience of the workman, rather than through scientific investigation. The industry, in general, is in a state of chaos. Costs are altogether too high, mechanical operations are often performed in a crude and inefficient manner and standardization is conspicuous by its absence.

One engineer in a concern known for its efficiency methods, was delegated to standardize the polishing department. After spending some time in the department he had to report that he was unable to find a point from which to start. Another engineer searched libraries of universities and technical societies for data on the subject. He found absolutely nothing.

Design of the Article to Be Polished

Polishing begins in the drafting room. Wheels of large diameter are more economical to use than wheels of small diameter. The article to be polished should be designed, therefore, to eliminate all unnecessary projections, depressions, angles, recesses or reverse curves, which can be polished only with narrow or small wheels and at excessive costs. Usually the cost of any extra metal involved can be more than offset by the saving in polishing.

Relation of Preceding Processes to Polishing

When castings are to be polished without previous operations, they should be as free as possible from excessive sprues, ragged edges, lumps or other surface defects. With forgings, as much scale as possible should be removed. In drawn or stamped work, deep drawing marks or scratches caused by imperfect dies should be eliminated by correcting the dies. Work which is tooled, or which is ground on solid wheels, should be so processed that the surfaces will not be too rough. Deep tool or grinding marks necessitate removal of too much metal, to reduce the entire surface to the level of the bottom of such marks.

Work should be delivered to the polishing department in such condition that it will not be necessary for that department to correct the errors of other departments. The cost of correction in the polishing department usually exceeds that in the department where the incorrect condition originates.

In an ax factory the forged ax when it left the dies was true to contour, but with an extra thickness of metal to allow for grinding off the scale. The solid-grinding operation to remove the scale destroyed the contour and left the surface in scallops or waves. It required at least three operations, which should not have been necessary, to restore the contour and prepare the surface to take a polished finish. The installation of a cheap and simple process for removing the scale while the metal was red hot eliminated the solid grinding and several polishing operations, and greatly reduced the cost of finishing.

Absence of vibration is necessary for successful polishing. A polishing wheel, like any high-speed unit, is susceptible to vibration. A vibrating wheel makes scratches which cost time and money to remove. A polishing wheel works at best efficiency only when the entire face of the wheel comes in contact with the article being polished, at every revolution of the wheel.

Good dust-collecting systems should be installed so that the dust from the wheels may be quickly removed. Abrasives will fly from the wheels; and if the grains from the coarse wheels come in contact with work undergoing finer operations, deep scratches will be caused. It costs money to take these scratches out.

Polishing Machines

Rigidity and durability are the factors of greatest importance in polishing machines. The items which enter into these factors are the size of the machine, its weight, floor area of the base, design and construction, size, location and type of bearings, and shaft material and diameter. With improved glue handling methods, peripheral speeds of from 7000 to 10,000 ft. a min. can be used, requiring a better class of machines than those used a few years ago, when peripheral speeds rarely exceeded 5000 ft. a min.

All buffing wheels, and a great many polishing wheels, wear down in diameter. They operate, therefore, at a constantly reduced efficiency, due to decreased surface speeds. Direct current, permitting the use of variable-speed motors, is found in only a few localities. To transform alternating to direct current is too expensive to be generally satisfactory.

The best answer to this variable-speed question seems to be an electric motor built into, or attached to, the column of the machine and belted to the wheel shaft. Another form of variable-speed machine recently introduced uses bevel gears, in which, by changing the gear ratio, variable speeds are secured.

Automatic Polishing

Automatic polishing is rapidly taking its place in the industry for processing large productions of flat pieces, or pieces having a portion of their surfaces flat. Flat parts of pliers, or such articles as plane blades, flatirons, monkey and pipe wrenches, sheet metals, strip steel, flat bars, knife blades are samples.

While at present interest in the automatic polishing of flat work predominates, round bars, tubes, and contoured pieces are also being successfully produced on automatic machines. The variety of work capable of accomplishment by automatic processes is rapidly increasing.

Many conditions arise not present in hand work, for the machine is without the human "feel." The work and the wheels are in fixed positions in relation to each other, and the machine cannot correct imperfections in the work as the hand operator can. It is necessary that the work be brought to automatic machines in better condition for polishing than with hand work.

That automatic polishing reduces costs and speeds up production is shown by examples. On one automatic machine, hot-air registers 40 in. square are being solid-ground, flexibly ground, and polished ready for enamel (a ten-wheel operation), in 5 min. 40 sec. each. On another machine 2400 flatiron bottoms an hour are finished. In another case 3500 small flat pieces an hour are turned out by one man operating three machines. In the steel trade a ton of cold-rolled sheets 36 x 60 in. has been polished, one side at a time, in 38 min.

(*Concluded on Page* 671)

*President Divine Brothers Co., Utica, N. Y. This is abstract of a paper at New Haven, Conn., Sept. 8, before meeting of the American Society of Mechanical Engineers, Machine Shop Practice Division.

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September 8, 1927

This Issue in Brief

What is the future of the small manufacturer? "There is no future for him if he is too small to make use of the cheapest power and the most efficient machinery for his purpose," says Harvard economist. If he is large enough to make use of these, there is a possible future, though it is dependent upon his being able to solve his bargaining problems, i.e., the ability to buy as cheaply as the giant corporations, control patents, sell his securities and sell his output.—Page 679.

Molten metal sprayed on to repair defects in machined, forged or cast parts. Metal spray gun adds metal where needed. Parts are then ground to proper size.—Page 680.

Tool steel users are lengthening drawing time. Where a draw of one hour for high-speed steel was formerly used by many manufacturers, they are now using three and four hours, and even longer.—Page 617.

Boil tap water to prevent soft spots in steel. Practically all tap water is aerated, and unless boiled, it often causes soft spots in water-quenched steels.—Page 617.

Look out for decarburization in salt bath mixtures containing carbonates, and straight chloride mixtures, says metallurgist. Sam Tour says that these mixtures will cause decarburization after being in use for some time.—Page 615.

Malleable castings can be hot-galvanized without embrittlement. The castings should be heated to about 1200 deg. Fahr. and quenched in water around 175 deg. Fahr.—Page 611.

Don't condemn salt baths for heat treating if proper furnaces are not used. Best results will be obtained only if furnaces designed for the purpose, and proper containers and mixtures, are used, says metallurgist.—Page 616.

Carburizing by gas method costs less and produces better results, says Timken official. Declares that more work can be produced per cubic foot of container, that heat is conserved, less labor needed, and that gas is much more easily controlled than are carburizing compounds.—Page 612.

Demand for superior welds will bring about an increase in the heat-treating of welds. Owing to the fact that the critical points of weld metal and the time needed for changes to occur are not the same as for the base metal, heat treatment is bound to be complicated and expensive. But the demand for increased physical properties will increase the heat-treatment applications, says S. W. Miller.—Page 614.

Stresses in gray iron can be discovered by sawing partly through with a hacksaw. If a stress exists, the kerf will spring apart or close together. Proper normalizing will remove stresses.—Page 611.

Castings are cooled on an overhead conveyor 4½ miles long. Cooling conveyor in new Buick foundry is housed under a skeleton structure open on all sides to secure a free passage of air. It takes 1½ hr. for the castings to pass the length of the conveyor. When they have reached the end they are cool enough to be handled by hand.—Page 644.

How to keep your polishing costs low. Design the article to be polished so as to eliminate all unnecessary projections, depressions, etc., for they can be polished only with small wheels and at excessive cost. Don't force the polishing department to correct the errors of other departments. See that the work is delivered to the polishers free from flaws, for it usually costs more to correct an error by polishing than in the department responsible.—Page 645.

Aluminum bronze attains a strength close to 100,000 lb. per sq. in. Elongation is 1 per cent and Brinell hardness 240. After quenching and reheating, with subsequent cooling, the tensile strength is about 90,000 lb. per sq. in., elongation about 13 per cent, and hardness 140.—Page 618.

Germany is loath to exchange Ruhr coke for Lorraine ore. Lorraine iron makers are handicapped by lack of a suitable fuel. The Ruhr can import ores economically, but Lorraine is forced to content itself with poor quality coke made from Saar coal.—Page 678.

Cyanide bath is said to give high-speed steel an intensely hard surface. After hardening and drawing in the regular manner, the steel is immersed for 10 to 15 min. in a bath of cyanide at 1100 deg. Fahr.—Page 617.

American machinery builders are finding a growing market abroad. July exports were valued at over $40,000,000, a gain of 17 per cent over June.—Page 683.

Fight for world steel business is getting hotter. British producers of finished steel grant a liberal rebate to customers who engage to buy all their requirements from domestic mills. Germany retaliates by cutting pig iron prices; in addition, the German railroads announce freight rebates on steel for export. Cleveland, England, pig iron makers grant a concession to Scottish and export buyers of quantities.—Pages 648 and 681.

"If competition is unsound, prosperity will be undermined." Tax returns reveal that 39 per cent of the manufacturing corporations lost money or made no profit in 1925. Industrial Conference Board head calls attention to the demoralizing effect of selling below cost, to secure a temporary advantage.—Page 679.

ESTABLISHED 1855

THE IRON AGE

A. I. FINDLEY, *Editor* W. W. MACON, *Managing Editor*

Member of the Audit Bureau of Circulations and of
Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York
C. S. BAUR, *General Advertising Manager*

F. J. Frank, *President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 239 West 39th Street, New York. A. C. Pearson, *Chairman*. F. J. Frank, *Pres.* C. A. Musselman, *Vice-Pres.* Fred C. Stevens, *Treas.* H. J. Redfield, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 425 Park Square Building. Philadelphia: 1402 Widener Building. Cleveland: 1362 Hanna Building. Detroit: 7338 Woodward Ave. Cincinnati: First National Bank Building. Buffalo: 835 Ellicott Square. Washington: 536 Investment Building. San Francisco: 320 Market St.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single Copy 25 cents.

Entered as second-class matter, June 18, 1879, at the Post Office at New York, N. Y., under the Act of March 3, 1879.
PRINTED IN U. S. A.

European Competition Sharper

DISPATCHES in this issue from London and Berlin are on first reading unsettling. Following the reduction in Cleveland pig iron, reported in our London cable two weeks ago, we now have a liberal rebate granted by British producers of finished steel to customers who engage to buy all their requirements from domestic mills. The aim, of course, was to check foreign imports. However, Germany has now not only retaliated by cutting pig iron prices but the German railroads have announced freight rebates on export steel.

These episodes of a fortnight are essentially matters of European competition and on their face are not aimed at the American industry in respect to either exports or imports. Yet the thought will intrude that the aggressive quest for international trade was an active ferment in the situation which preceded the World War. A saving difference now is that there is nothing in the nature of help from Government subsidies; instead, the industries must carry their own loads, and it is the railroad corporation of Germany that has made the concession on freights.

As part of the background of these latest developments is the fact that domestic steel producers, though often solicited, especially from Great Britain, have looked upon American membership in European steel cartels as neither desirable nor necessary. While the Webb act permits our manufacturers to cooperate for the furtherance of our export trade in competition with exporters in other countries, there is doubt of a friendly attitude by Washington toward cooperation by a group of American manufacturers with groups of competing manufacturers in foreign countries for the fixing of prices and division of world territories.

Considering the general state of world trade, our exports of steel have been reasonably large. It has long been accepted by British steel makers that the United States has made a place for itself in the international steel trade. There are indications, moreover, that the counsels of British members in the European Rail Association have been influential with their associates in Continental countries as to the futility of competing destructively against the United States in the international rail market. It is probable also that full information about the operation of the Continental steel cartels in finished materials apart from rails has been available to American exporting companies. The Continental steel companies have not cared to come to grips with American producers in an effort to displace them in markets to which this country has been shipping steel for years; on the other hand, they have deprecated an over-aggressive pursuit of business in new quarters by exporters of American steel.

At the same time, it is not to be overlooked that Continental countries have not been increasing materially their sales in the United States. In the first seven months of this year our imports of finished and semi-finished steel were 258,000 tons, as against 238,000 tons in the like period of 1926. The figures give no indication of a definite plan for an increasing penetration into this market. They rather bear out the various published expressions of Judge Gary to the effect that the Continental steel cartels were not aiming at larger possession of the American market. Somewhere brakes are periodically applied. They may have been eased at times in the case of our own export bookings, although prices obtained do not prove that fact.

Now that there seems to be a definite rift in the efforts to develop a unity in the European steel trade, the question is raised whether there may be some disturbance of the comparative calm in our own foreign activities. European makers, especially those of Great Britain, have had many occasions to know the ability of our export companies to hold the position they have acquired in important foreign markets. They have been attentive students of the give-and-take policy the United States Steel Corporation has pursued in its relations with independent producers at home and have found that it closely parallels the Steel Corporation's policy in the markets of the world. They are not at all likely to try conclusions with the corporation by attempting to raid foreign markets in which it has long been active.

The Trend of Coal Prices

IT will be a mistake to assume because the non-union soft coal mines are capable of producing from 10,500,000 to 11,000,000 tons weekly, or what is commonly regarded as the country's normal weekly requirements during the fall and early winter, that industry is freed from the danger of market disturbances or higher prices. The location of most of the coal production apart from what have been regarded as union districts must be considered in relation to the consuming points to which it will move while union mine production is suspended.

Before the creation of the Federal Reserve banks it was not unusual to have money grow scarce and dear in the East when funds were required for the harvesting and marketing of the Western crops. The elastic currency and credit system of today has changed all that; but there is no way of bringing the non-union coal mines closer to consumers naturally dependent on union mines. The long-distance movement of coal to the new markets may in time have a far-reaching effect upon prices. Car shortages are one result of the movement of coal to points more distant than those usually served, and limitation of production follows quickly, since full operation of the mines requires a sufficient car supply beneath the tipples to take the coal as it comes out of the mines. Thus the distribution as well as the production of coal will influence the course of prices over the remainder of the year as supplies in union districts are drawn upon for heating purposes.

The Cheapness of Steel

FOR several years after the war there was a disposition, if not to expect prices to return to the "pre-war level," at least to watch and see if they showed a disposition to do so. At this late date we realize that there is no impelling force of that sort and that prices of various commodities are subject to their own separate influences. Lately prices have been tending to diverge rather than to converge upon their pre-war levels.

An interesting comparison can now be made, showing how cheap steel has become relative to various other commodities. The comparison is better based on the ten-year average, 1904 to 1913 inclusive, than on the single year 1913, for that was a year in which farm products and building materials were higher, and steel was lower, relative to commodities in general, than in the nine preceding years.

Converting the last Bureau of Labor index numbers from 1913 basis to 1904-13 basis, the index for all commodity prices, 144.6, becomes 155; the farm products index, 140.5, becomes 159, and the building materials index, 162.4, becomes 174. Thus farm products are now somewhat higher, and building materials decidedly higher, relative to other commodities than in the ten years before the war. Selection of 1913 as the base of so many statistical presentations has given the edge to the farmer, who wants to perpetuate the relationship in a year in which he was particularly well fixed.

When it comes to iron and steel, pig iron is only 17 per cent above its 1904-13 average and steel is only 40 per cent above. The farmers complain about railroad rates, but the ton-mile receipts are up only 50 per cent and the passenger-mile receipts only 48 per cent, from the 1904-13 average. Accordingly we have the following index numbers for the present time, each item being based, as 100, on its ten-year pre-war average:

Index Numbers Based on 1904-13 Average	
All commodities	155
Farm products	159
Building materials	174
Pig iron	117
Finished steel	140
Ton-mile receipts	150
Passenger-mile receipts	148

Outside of a few very biased groups, it will not be contended that any industries here referred to are making inordinate profits. There will merely be an admission that to the merchant furnaces profits are virtually absent while for the steel mills there is not the profit shown by many industries.

In drawing conclusions from the above figures it needs to be stated that there has been a great increase in wages both of steel mill and railroad labor. When in such circumstances steel prices and railroad receipts are considerably lower, relative to the average of commodity prices, than in the ten years before the war, there is indication of an increase in efficiency. Such increase in efficiency is totally lacking in the case of farm products and building materials, or else there are inordinate profits in those lines, which no one contends. Efforts, then, should be directed toward increasing the efficiency.

Petroleum a Continuing Problem

ONE of the most embarrassing and perplexing problems of the time is the situation in the petroleum industry of the United States. Here we have a wasting asset in the form of the most valuable of fuels, which will be irreplaceable when exhausted, as some day inevitably it will be. Yet we have such occurrences as the discovery of a new oil field, like Seminole, with a race of competing exploiters to drain it as rapidly as possible, and the attainment within twelve months of a rate of production amounting to 20 per cent of that for the entire United States.

The fundamental evil of petroleum production in the United States is our land system, which in the main has resulted in the subdivision of our area into relatively small tracts. In most other respects this has been economically beneficial. Even in petroleum production it has operated for a diffusion of great fortunes. But in this, as in other things, the principles of democracy operate counter to those of efficiency.

An explorer for petroleum seldom can afford to acquire large tracts of land in fee. He leases from the owners their mineral rights, including petroleum, paying a small sum per acre for the privilege and agreeing to hand over as royalty a proportion, usually one-eighth, of whatever valuable product may be discovered and produced. Many of these leases require that prospecting by drilling be instituted within a specified time.

Petroleum, existing as a liquid, is a migratory substance; that is, it may flow subterraneously from one place to another. Theoretically a land owner has the right only to that which saturates the strata of sand comprised within vertical downward projections of his boundary lines. It may easily

happen that a well drilled on one parcel of land will drain not only its oil but also that from surrounding parcels, the owners or lessees of which must make haste to put down wells in order to obtain their own rightful share. Immediately following the discovery of a new oil pool there is consequently a rush among rival interests to drain it dry, each aiming to get as much as possible while the getting is good.

This basic condition, tending ever to produce periods of over-production, has been enhanced by progress in science and art. Geologists through their improved knowledge of the structure of petroleum-bearing formations have been able to concentrate upon likely regions and thus have increased the ease of discovery far beyond the haphazard exploration of only 20 years ago.

Geophysical methods recently introduced have made it possible scientifically to locate unseen subterranean domes. Mechanical methods of drilling have made it practicable to bore holes to depths far greater than those of the churn drill of olden time. More scientific methods of shooting wells with nitroglycerine and the quite recent application of air pressure have increased the flow of wells.

Even with these modern methods of exploitation the extraction of oil per cubic foot of saturated sand is only a small proportion of what exists in it, perhaps not more than 20 per cent. This is far higher than the percentage of only 10 years ago, but nevertheless it is still so small that consideration has been given to the possible advantage of actually mining oil-bearing sand by sinking shafts to it. This may never pass beyond being a speculative thought. Without discussing this any further, and without discussing the possibility of synthetic petroleum, we may confine ourselves to the recognition that science and art have already increased the extraction of petroleum from any given area. Many conditions have thus contributed toward the production of floods of oil, which may be expected to come at intervals until some system of regulation or industrial organization for control is devised; or until our oil resources approach exhaustion.

So long as excessive oil production is capable of being received and is not allowed to run away there is no direct waste of the commodity. The petroleum producers appear to have become able to cope with this condition. The lowering of prices by competition in selling a greater volume of a commodity does not in itself imply economic waste if the commodity goes into good use.

In excessive petroleum production, there are nevertheless distinct wastes, which appear largely through capital charges. More drilling and equipment of wells is always done than a more gradual draining of a pool would require. Likewise more pipe line capacity and tankage must be provided than would otherwise be necessary. The accumulation of an inordinately large surplus of oil implies increased carrying charges and increased loss of volatile constituents. Finally the offering of very cheap products is an incentive to extravagance in their use, and leads to waste if they be consumption goods. A careless automobilist will for example let his engine idle more with cheap gasoline than with dear. A considerable quantity of our petroleum products is exported and we let foreign consumers enjoy themselves at the expense of a loss of interest on our investments, with a further penalty that the day is brought nearer when we shall have to pay higher prices for our own requirements of gasoline.

The remedies for this admittedly bad industrial condition are not easy of suggestion. The shadow of the Sherman law hangs over most projects for cooperative organization. Anything of that sort must look forward to the advancement of prices. Washington construes the Sherman law as being prohibitive of anything of that nature if it be collusory. Yet it seems absurd to interpret the Sherman law as meaning that an industry must sacrifice its investment and commit economic suicide.

A producer of ores may individually refuse to do so, firm in his knowledge that his resources will remain in a safe place; but the petroleum producer knows that his will not remain in safety, and that if he does not quickly get all that he can, competitors will drain him dry.

It has been suggested that upon the discovery of any new pool all competitors shall unite in an arrangement to exploit it as a whole, deliberately and most economically, sharing the proceeds according to acreage. We should not think that the guardians of the Sherman law would have anything adverse to say of so sound a proposal. But how about the individual property owner who might insist upon the drilling of his land in conformity with his terms as lessee?

Another plan that is now on trial in the Seminole field is restriction of production by agreement, which the State of Oklahoma approves, and which it is hoped that Washington will not oppose. The State of Oklahoma has indeed assumed the attitude of enforcement out of its own interest in the conservation of resources.

This is about as far as the petroleum industry has progressed in corrective thought. We wonder, however, why the great companies have not given consideration to an agreement among themselves not to build any more pipe lines for some time to come. In the absence of pipe line facilities the discovery of new fields will not be very dangerous.

Such an agreement would be collusory and would have in view the enhancement of price. We wonder if the courts would so construe the Sherman law as to penalize men for agreeing not to invest capital for the plain purpose of industrial overbuilding. Such an agreement might run right down to the refineries. The field would ever be open to adventure by new interests. But who would want to do that in an overbuilt industry against which no criticism can be offered on the ground of technical inefficiency? Such an agreement would be an expression of sound economic thought and would not be in restraint of competition among the refiners, who could by no possibility let either prices or profits run too high lest they should tempt new adventurers.

The petroleum industry is one of the important consumers of iron and steel, directly and indirectly. The more wells to be equipped, the more tankage to be provided, and the more pipe lines to be built the more is the immediate demand upon the steel producer. Short-sightedly he may relish this; but in the long run the welfare of no industry is promoted by waste in another.

Steel Tonnage By Processes

PRODUCTION of steel ingots last year was closer to capacity in the case of basic open-hearth than in the case of any other process, while the production of crucible ingots was smallest relative to capacity. The appearance of the annual statistical report of the American Iron and Steel Institute gives opportunity for study of production relative to rated capacity, as capacity by the individual processes is given. For Dec. 31, 1925, and Dec. 31, 1926, the "theoretical capacity" is given, as reported by makers and scrutinized by the institute's capacity committee, eliminating long-idle plants. For comparison with actual production in 1926 the mean of capacity on the two dates may be taken, production relative to capacity being then as follows:

Steel Ingots, 1926

	Production, Gross Tons	Per Cent of Capacity
Basic open-hearth	39,172,688	83.8
Acid open-hearth	533,285	60.2
Bessemer	6,891,502	81.0
Crucible	13,452	19.0
Electric	325,278	46.0
Total	46,936,205	82.5

The relatively low percentage rate of operation of acid open-hearth capacity is not particularly significant. At many plants such capacity is kept as an adjunct, to supply demand, presumably profitable, as it chances to develop. As to crucible, there is merely a survival of old capacity, this process having been engaged in passing out. The electric percentage is low but there are good chances of gains in future. The percentage of Bessemer seems high when that process has been decadent for twenty years, but the high percentage is merely a reflection of the freedom with which Bessemer capacity has been abandoned, the reported capacity having decreased by one-third from the end of 1921 to the end of 1926.

An interesting point in the capacity figures is the 3.8 per cent increase in the reported total "theoretical capacity" during the year 1926, from 55,844,033 tons to 57,999,171 tons. The increase during the year was 2,155,138 tons. The actual new construction during the year as reported in the Annual Review Number of THE IRON AGE was only 865,000 tons, and there may have been some abandonments. Evidently, and presumably with good reason, various works increased their capacity estimates because of improvements not involving construction of new units and on account of increased efficiency in actual practice.

In the circumstances, there may be hesitancy in adopting the suggestion that the "practical capacity" increased during 1926 only from 50,000,000 to 51,000,000 tons, or by less than one-half the reported increase in "theoretical capacity." The mean for 1926, 50,500,000 tons, would make production at 92.94 per cent of capacity, while the mean of the theoretical capacities makes 82.46 per cent for the year. Some light on this matter might be thrown by asking the question from the other side, whether the average amount of idleness in the year was 7.06 per cent or 17.54 per cent.

Widening Field for Heat Treatment

WHEN the American Society for Steel Treating was born in Chicago in 1919, few of its founders would have dared a prediction of the growth eight years have brought. Not only has the relation of heat treatment to the entire metal industry expanded greatly, but various branches of science have become intimately associated with it. Today thermal treatment of both ferrous and non-ferrous metals and alloys is becoming more and more bound up with magnetic analysis, X-rays, metallography and welding. To hold up a picture of the present-day situation before the steel treaters who meet for their ninth convention at Detroit two weeks hence, THE IRON AGE presents the sixteen articles which feature its special edition of this week.

In this brief comment on the symposium only a few of the notable developments and trends can be singled out. The applications of heat treatment in the non-ferrous field probably have the widest future significance. Already some light aluminum alloys, both wrought and cast, are made equal in strength to certain steels; copper alloys of high-copper content are being definitely improved; and all non-ferrous metals may soon be advantageously heat-treated, as in the ferrous field where thermal treatment started. In this older field—in tool, spring, automobile and alloy steels—marked improvement in properties has been achieved and new steels and treatments have been perfected.

All branches of the foundry industry have now been invaded by heat-treating methods. In the steel foundry, where they were first applied, improved procedure and equipment have appeared. Steel castings today have properties considered unattainable less than ten years ago. Also, certain malleable processes have been bettered. But in iron castings the most significant advance has taken place. Today the annealing and normalizing of gray iron are commercial realities and quenching and drawing for certain types are a possibility. Who shall say that gray iron has seen its best days?

As our contributors point out, magnetic analysis, metallography and X-rays are taking a larger place. One company has used magnetic analysis in regular testing for five years. Only this year announcement was made of its value in detecting proper heat treatment of steel, and "methods to tell at a glance whether one piece is like another and in what respect it is different" are expected. "Good, poor and indifferent heat treatments are explained on the basis of structure" as detected by metallography, without which "heat treatment is an operation guided by experience rather than reason." And one writer dares to predict that X-rays may enable the future metallurgist to "write a prescription for an alloy" of definite properties.

Schedule of the next installments of the ***Business Analysis and Forecast,*** *by Dr. Lewis H. Haney, Director of New York University Bureau of Business Research, follows:* ***Sept. 15****—Activity in Steel Consuming Industries;* ***Sept. 22****—Position of Iron and Steel Producers;* ***Sept. 29****—General Business Outlook.*

Small Loss in August Iron Output

Daily Rate Falls only 126 Tons from July, According to Actual Data—Net Loss of Only 3 Furnaces

COMPLETE returns of the actual production of pig iron in August show the preliminary data, published last week, to have been fairly close to the real output. The final total reveals an even smaller falling off from July than the estimated figures.

Total August production was 2,947,276 gross tons, or 95,073 tons per day against 2,951,160 tons in July, or 95,199 tons per day, both months having 31 days. The decline in the daily rate from July was only 126 tons. Last week's preliminary estimates showed a decline of 484 tons per day. The decline in July from June was 7789 tons per day and in June from May, 6397 tons per day—indicating possibly a check in the falling off which started in April and which has been uninterrupted. A year ago the August daily rate was 103,241 tons and, with this exception, August this year is the largest for that month since 1923.

Net Loss of Three Furnaces

There were 9 furnaces shut down in August and 6 blown in, a net loss of 3 stacks. This compares with a loss of 8 in July, of 13 in June, of 9 in May, and of 3 in April. In March there had been a net gain of 6 furnaces.

Of the 9 furnaces shut down last month, 3 were credited to the Steel Corporation, 3 to independent steel companies and 3 to merchant iron producers. The 6 blown in were as follows: Steel Corporation,

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
August, 1926	78,216	25,025	103,241
September	81,224	23,319	104,543
October	83,188	24,365	107,553
November	82,820	25,070	107,890
December	74,909	24,803	99,712
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988
July	69,778	25,421	95,199
August	71,413	23,660	95,073

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	Aug. (31 days)	July (31 days)	June (30 days)	May (31 days)
New York and Mass.	231,625	226,700	216,194	227,105
Lehigh Valley	88,451	84,429	84,388	87,198
Schuylkill Valley	37,284	52,510	58,224	74,892
Lower Susq. and Lebanon Valleys	31,244	27,173	30,300	41,274
Pittsburgh district	580,459	534,610	573,967	680,858
Shenango Valley	98,687	105,136	118,233	123,075
Western Penna.	96,833	97,399	98,676	116,771
Maryland, Virginia and Kentucky	95,528	96,070	96,676	106,601
Wheeling district	130,065	136,265	136,251	150,487
Mahoning Valley	265,726	263,456	272,834	275,904
Central and Northern Ohio	327,703	340,306	340,810	346,620
Southern Ohio	27,046	32,479	41,828	43,995
Illinois and Indiana	572,623	587,755	649,019	705,759
Mich., Minn., Mo., Wis., Colo. and Utah	140,069	146,938	140,507	147,755
Alabama	212,337	208,739	220,230	250,456
Tennessee	11,596	11,195	11,514	12,190
Total	2,947,276	2,951,160	3,089,651	3,390,940

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1923—Gross Tons

	1923	1924	1925	1926	1927
Jan.	104,181	97,384	108,720	106,974	100,123
Feb.	106,935	106,026	114,791	104,408	105,024
Mar.	113,673	111,809	114,975	111,032	112,366
Apr.	118,324	107,781	108,632	115,004	114,074
May	124,764	84,358	94,542	112,304	109,385
June	122,548	67,541	89,115	107,844	102,988
½ year	115,147	95,794	105,039	109,660	107,351
July	118,656	57,577	85,936	103,978	95,199
Aug.	111,274	60,875	87,241	103,241	95,073
Sept.	104,184	68,442	90,873	104,543	.....
Oct.	101,586	79,907	97,528	107,553	.....
Nov.	96,476	83,656	100,767	107,890	.....
Dec.	94,225	95,539	104,853	99,712	.....
Year	109,713	85,075	99,735	107,043	.....

Coke Furnaces in Blast

Furnaces	Total Stacks	Sept. 1 In Blast	Sept. 1 Capacity per Day	Aug. 1 In Blast	Aug. 1 Capacity per Day
New York:					
Buffalo	21	13	5,790	13	5,770
Other N. Y. and Mass.	6	3	1,190	4	1,590
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	11	6	2,070	6	2,180
Spiegeleisen	2	2	295	2	300
Schuylkill Valley	12	4	1,415	3	1,420
Susquehanna Valley	4	2	860	2	815
Ferromanganese	1	1	70	1	65
Lebanon Valley	0	0	....	0	....
Ferromanganese	2	0	....	0	....
Pittsburgh District	52	30	17,575	28	16,340
Ferro. and Spiegel	4	2	340	2	330
Shenango Valley	13	5	2,425	7	3,135
Western Pennsylvania	18	6	3,130	6	2,905
Ferromanganese	2	1	220	1	245
Maryland	5	5	2,160	5	2,165
Ferromanganese	1	0	....	0	....
Wheeling District	13	7	4,000	8	4,395
Ohio:					
Mahoning Valley	26	14	8,350	14	8,300
Central and Northern	23	18	10,570	19	11,075
Southern	13	3	875	3	900
Illinois and Indiana	44	28	18,170	29	18,715
Mich., Wis. and Minn.	12	7	2,975	7	3,015
Colo., Mo. and Utah	7	4	1,700	4	1,725
The South:					
Virginia	14	1	240	1	230
Ferromanganese	1	0	....	0	....
Kentucky	5	2	680	2	700
Alabama	34	19	6,975	19	6,965
Ferromanganese	1	1	60	1	60
Tennessee	12	3	365	3	360
Total	362	187	92,500	190	93,700

Production of Steel Companies for Own Use—Gross Tons

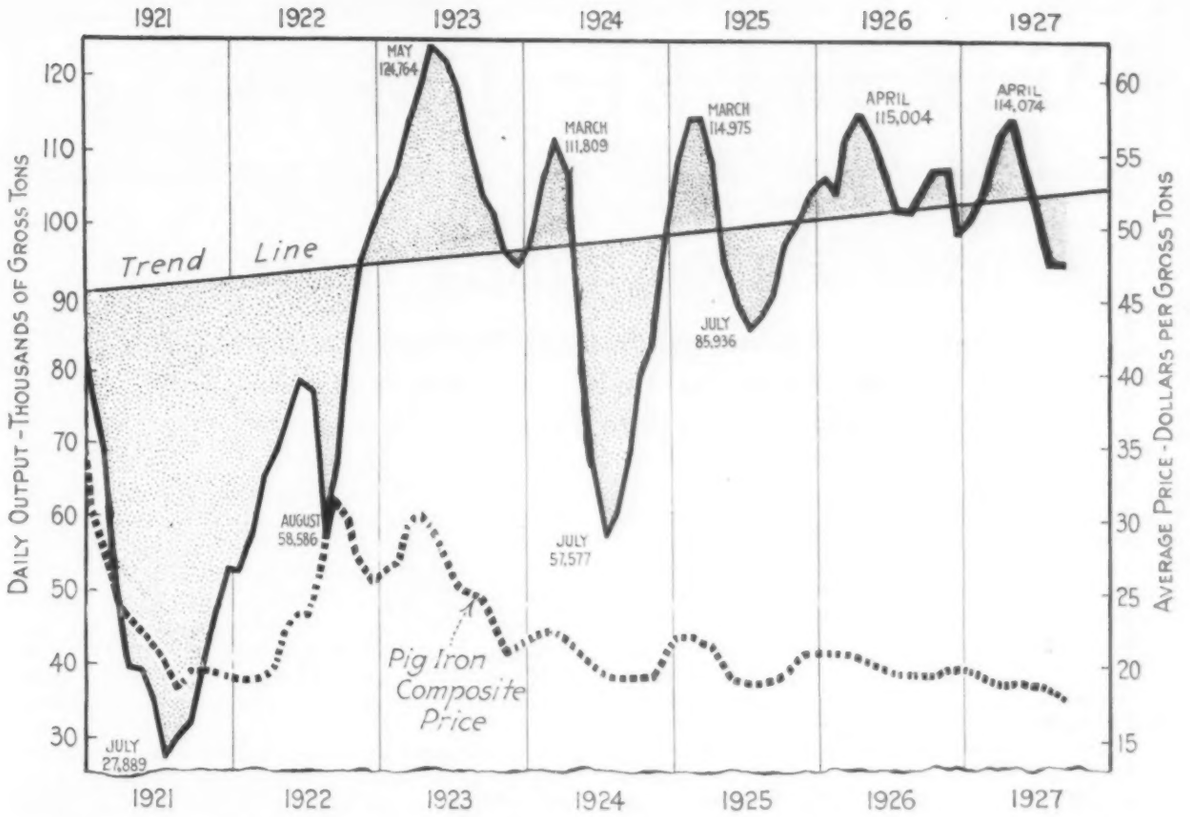
	Total Iron, Spiegel and Ferro		Spiegeleisen and Ferromanganese* 1926 Fe-Mn	1926 Spiegel	1927 Fe-Mn	1927 Spiegel
	1926	1927				
Jan.	2,599,876	2,343,881	29,129	7,746	31,844	7,486
Feb.	2,272,150	2,256,651	22,309	7,084	24,560	7,045
Mar.	2,661,092	2,675,417	24,064	7,339	27,834	7,650
Apr.	2,677,094	2,637,919	24,134	7,051	24,735	12,907
May	2,687,138	2,619,078	23,159	6,999	28,734	9,788
June	2,465,583	2,343,409	25,378	5,864	29,232	10,535
½ year	15,362,933	14,876,355	148,173	42,083	166,939	55,411
July	2,461,161	2,163,101	26,877	3,699	26,394	9,350
Aug.	2,424,687	2,213,815	23,557	4,372	21,279	9,104
Sept.	2,436,733	.....	25,218	2,925	....	....
Oct.	2,578,830	.....	28,473	6,295	....	....
Nov.	2,484,620	.....	31,903	7,565	....	....
Dec.	2,322,180	.....	31,627	7,157	....	....
Year	30,071,144	.....	315,828	74,096	....	....

*Includes output of merchant furnaces.

Production of Coke Pig Iron in United States by Months, Beginning Jan. 1, 1925—Gross Tons

	1925	1926	1927
Jan.	3,370,336	3,316,201	3,103,820
Feb.	3,214,143	2,923,415	2,940,679
Mar.	3,564,247	3,441,986	3,483,362
Apr.	3,258,958	3,450,122	3,422,226
May	2,950,807	3,481,428	3,390,940
June	2,673,457	3,235,309	3,089,651
½ year	19,011,948	19,848,461	19,430,678
July	2,664,024	3,223,338	2,951,160
Aug.	2,704,476	3,200,479	2,947,276
Sept.	2,726,198	3,136,293	.....
Oct.	3,023,370	3,334,132	.....
Nov.	3,023,006	3,236,707	.....
Dec.	3,250,448	3,091,060	.....
Year*	36,403,470	39,070,470	.....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in August Was Less Than 0.15 Per Cent Lower Than in July; Composite Price Decreases Slightly

Inclined Line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

1; independent steel companies, 4; merchant companies, 1.

There has been no change in the number of possible active furnaces which is still 362.

Capacity Active on Sept. 1

On Sept. 1 there were 187 furnaces active compared with 190 on Aug. 1. The estimated rate of the 187 furnaces was 92,500 tons per day, while on Aug. 1 the 190 furnaces had an estimated operating rate of 93,700 tons per day.

Manganese Alloy Output

The August production of ferromanganese was 21,279 tons or the smallest this year. In July the output was 26,394 tons. There was 9104 tons of spiegeleisen made last month as compared with 9350 tons in July.

Furnaces Blown In and Out

Among the furnaces blown in during August were the Keystone furnace in the Schuylkill Valley; one furnace at the Steelton plant of the Bethlehem Steel Corporation in the Lower Susquehanna Valley; one Aliquippa furnace of the Jones & Laughlin Steel Corporation and one furnace of the Pittsburgh Crucible Steel Co. in the Pittsburgh district; one furnace of the Colorado Fuel & Iron Co. in Colorado and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Among the furnaces blown out or banked during August were one furnace of Witherbee, Sherman & Co. in New York; one furnace at the Steelton plant of the Bethlehem Steel Corporation in the Lower Susquehanna Valley; the Shenango furnace in the Shenango Valley; one Mingo furnace of the Carnegie Steel Co. in the Wheeling district; one Gary furnace in the Chicago district; one furnace of the Colorado Fuel & Iron Co. in Colorado and one furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Ask Receiver for Falcon Tin Plate Co.

Suit against the Falcon Tin Plate Co., Niles, Ohio, for the appointment of a receiver and the foreclosure of a mortgage covering a $750,000 bond issue has been brought by the Union Trust Co., Cleveland, representing the bondholders, in the Common Pleas Court, at Canton, where the plant is located. The company, which was organized by men associated with the Falcon Steel Co., Niles, in 1922 took over the plant of the Carnahan Tin Plate & Sheet Co. It had not been operated for two or three years and the company defaulted in the payment of interest on its bonds.

Through the generosity of John R. Freeman, Providence, R. I., past president of the society, a fund has been created providing for the study of flood prevention and for the sending of two or more men every two years to Europe to spend a year in study and engineering research on subjects which will be of direct benefit to the development of the United States as well as to the promotion of engineering practice.

The Arch Machinery Co., 1005 Park Building, Pittsburgh, has taken the sales agency in the Pittsburgh district for the Nagel Engineering & Machine Works, Philadelphia, maker of the Nagel air hammer and Dill slotters.

Iron and Steel Markets

Buying Pace Slightly Increased

Production Unchanged, Backlogs Developing and Prices Fairly Steady—Turn Indicated by August Pig Iron Output—Pig Iron Prices Still Weak

SEPTEMBER starts at a better pace in steel demand than August, but the rate of production remains at about the average of both July and August. There is thus promise of swelling the backlogs of orders, which with most mills were the smallest in many months. A few producers have found rolling schedules a trifle more economical.

Building and construction enterprises continue to provide most of the expansion, including improvement in buttweld sizes of pipe. Heavy rail buying in August was almost negligible, though the railroads may be credited with somewhat better orders for barbed wire and nails. Light rail needs for the rest of the year are largely under contract. An increase in steel bar business has come from farm implement makers and forging companies.

Buyers generally, while showing more than the usual interest in supplies, are still covering only for their known needs. The third quarter in steel points to an output exceeding 70 per cent of capacity, but the third quarter last year required an 82 per cent operation, and the second quarter this year was over 82 per cent. Estimates now are that an 80 per cent rate will be reached in November.

Purchases being chiefly of the small lot class, prices are steady rather than strong. Some unsettling of the base for bars, plates and shapes has occurred in the Chicago territory, where outside mills have named 1.80c., Chicago, a cut of $2 a ton. In Pittsburgh, rarely more than 1.80c. is paid for small lots of plates or shapes.

The smaller producers of cold finished bars and shafting show a disposition to underquote the mills controlling most of the capacity, and shading of tin plate has not disappeared. Sheets remain surprisingly firm, what weakness has been uncovered being traced to resales by those who had secured material on deferred deliveries and at the lower prices prevailing prior to May.

The production of pig iron in August was 2,947,276 tons, or 95,073 tons per day, compared with 2,951,160 tons, or 95,199 tons per day in July. Thus the daily output was only 126 tons less than in July, whereas the decline of July from June was 7½ per cent and that of June from May was 6 per cent.

The reduction in production was among the merchant furnaces. The drop per day of these stacks averaged 1761 tons, while steel-company-owned furnaces pushed their tonnage 1635 tons a day over July.

On Sept. 1 there were 187 furnaces in blast, producing at a rate of 92,500 tons per day. On Aug. 1, when 190 stacks were active, the daily rate was 93,700 tons. The loss of three furnaces is accounted for by a net loss of two Steel Corporation and two merchant stacks and a gain of one among the independent steel companies.

Pig iron prices in some centers are not yet strong enough to stand the test of tonnage purchases. Eastern Pennsylvania foundry iron has declined 50c. a ton, and there have been further concessions on Southern iron from the commonly quoted price of $17.25, Birmingham. Chicago prices are wavering under the pressure of competition from water-borne iron from Cleveland. The effect of low water rates is also evident in the sale of 3000 tons for barge shipment from St. Louis to Louisville.

Spot furnace coke has declined 15c. a ton to $2.85, Connellsville, following the release of tonnage by blast furnaces that have failed to specify fully against their contracts.

Domestic fluorspar has receded 50c. a ton to $16.50, mines, on purchases for fall stocking by Pittsburgh district steel makers.

Included in the 32,700 tons of fabricated structural steel booked during the week were 6000 tons for a bridge across the Mississippi River near St. Louis and 4000 tons for a bridge across the Ohio at Paducah, Ky.

Machinery exported from the United States in July, at $40,222,514, made the largest month's total in recent years. It exceeded by nearly $6,000,000 the June exports and by $430,000 the large outgoing movement of April, which was the heaviest, to that time, in more than two years.

Imports of machinery were lower in July than in June and lower than in July, 1926. But the seven-month total this year is 15 per cent above last year.

The recent $3 a ton increase in ocean freights for Pacific Coast shipments via the Panama Canal is taken as a reason for the Bethlehem Steel Corporation's adding materially to its fleet of ocean-going vessels.

British efforts by rebates on steel to curtail imports have brought out German concessions to German consumers through reductions in pig iron and in rail freight rates on export shipments.

Dropping to within 2c. of the lowest level since 1916, THE IRON AGE composite price for pig iron stands this week at $18.04 a ton, compared with $18.13 for the four preceding weeks. The finished steel composite price is unchanged, remaining at 2.367c a lb. for the thirteenth week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 6, 1927	Aug. 30, 1927	Aug. 9, 1927	Sept. 7, 1926
No. 2, fdy., Philadelphia..	*$20.26*	$20.76	$20.76	$21.76
No. 2, Valley furnace....	17.50	17.50	17.50	17.50
No. 2, Southern, Cin'ti....	20.94	20.94	20.94	24.19
No. 2, Birmingham.....	17.25	17.25	17.25	21.00
No. 2 foundry, Chicago*...	19.50	19.50	19.50	21.00
Basic, del'd eastern Pa...	20.00	20.00	20.00	20.75
Basic, Valley furnace....	17.25	17.25	17.25	17.50
Valley Bessemer, del. P'gh	19.76	19.76	20.26	19.76
Malleable, Chicago*	19.50	19.50	19.50	21.00
Malleable, Valley	17.50	17.50	17.50	17.50
Gray forge, Pittsburgh....	18.76	18.76	18.76	18.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	29.04
Ferromanganese, furnace.	90.00	90.00	90.00	88.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill..$43.00	$43.00	$43.00	$43.00	
Light rails at mill.....	36.00	36.00	36.00	34.00
Bess. billets, Pittsburgh..	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh.....	34.00	34.00	34.00	36.00
Forging billets, P'gh.....	39.00	39.00	39.00	40.00
O.-h. billets, Phila.....	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh.....	43.00	43.00	43.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.12	2.12	2.12	2.22
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.80	1.80	1.80	2.00
Steel bars, Chicago.....	1.90	1.90	2.00	2.10
Steel bars, New York.....	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh...	1.80	1.80	1.80	1.90
Tank plates, Chicago.....	1.90	1.90	2.00	2.10
Tank plates, New York...	2.09	2.09	2.09	2.24
Beams, Pittsburgh.....	1.80	1.80	1.80	2.00
Beams, Chicago.....	1.90	1.90	2.00	2.10
Beams, New York.....	1.95	1.95	1.95	2.34
Steel hoops, Pittsburgh...	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Sept. 6, 1927	Aug. 30, 1927	Aug. 9, 1927	Sept. 7, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	3.00
Sheets, black, No. 24, Chicago dist. mill.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh	3.85	3.85	3.85	3.80
Sheets, galv. No. 24, Chicago dist. mill.....	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh.	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chicago dist. mill.....	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh....	2.55	2.55	2.55	2.65
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh...	3.25	3.25	3.25	3.35
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.30	3.40
Tin plate, 100 lb. Box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	$15.50	$15.50	$15.25	$18.50
Heavy melting steel, Phila.	14.00	14.00	13.50	17.00
Heavy melting steel, Ch'go	**12.25**	12.00	12.50	14.25
Carwheels, Chicago.....	14.50	14.50	14.50	15.25
Carwheels, Philadelphia...	15.50	15.50	15.00	17.50
No. 1 cast, Pittsburgh....	15.00	15.00	15.00	17.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	18.50
No. 1 cast, Ch'go (net ton)	14.75	14.75	15.00	17.00
No. 1 RR. wrot. Phila....	15.50	15.50	15.50	18.00
No. 1 RR. wrot. Ch'go, (net)	11.50	11.50	12.00	13.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt....	*$2.85*	$3.00	$3.00	$3.25
Foundry coke, prompt.....	4.00	4.00	4.00	4.25
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.25	13.25	13.50	14.50
Electrolytic copper, refinery	13.00	13.00	13.12½	14.12½
Zinc, St. Louis.....	**6.27½**	6.25	6.32½	7.40
Zinc, New York.....	**6.42½**	6.60	6.67½	7.75
Lead, St. Louis.....	*6.05*	6.30	6.52½	8.65
Lead, New York.....	*6.40*	6.60	6.80	8.90
Tin (Straits), New York..	**63.75**	63.50	65.12½	67.25
Antimony (Asiatic), N. Y.	*11.75*	12.00	12.00	16.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Recovery in Steel Trade Retarded by Delay in Appearance of Ford Model

PITTSBURGH, Sept. 6.—Sentiment among steel manufacturers is more cheerful, but the basis for this change is less in materially larger orders than in the fact that there has been some modification of expectations for the remainder of the year and current demands are more in line with the revised ideas of what is ahead for the next few months.

There has been some increase in the demand for steel bars, and sales of buttwelded pipe show a fair-sized upturn, while at least the largest fabricating shops and the leading maker of large structural shapes are well supplied with business. No appreciable increase in the sales of other finished steel products is noted, and in those lines where there have been gains there is the qualifying statement that there is room for more improvement.

Failure of the Ford Motor Co. to show its new model at the Michigan State Fair, which opened yesterday, as had been promised by Mr. Ford, is somewhat disappointing to those who had believed that as soon as this car was exhibited, there would follow a larger demand for steel not only from that company but from all other motor car producers. On the other hand, the advertising by Ford dealers urging buyers to wait for the new car, promising that it will be on the market soon, has had some favorable reaction among those serving the automobile industry. The doubt now is as to just what the word "soon" implies. Some parts makers serving the Ford company have not yet ordered any steel, and since some time must elapse between the shipment of the steel from the mills and its placement in the new car, it is patent that quantity production is unlikely in the next 30 days. Several other motor car builders will be in the market in the next week or 10 days, but the steel industry would feel much more cheerful about the prospect if the Ford car were going on a production basis in the immediate future.

In the final quarter of last year, automobile demand for steel slumped and it would not be hard for it to better its showing for that period this year. But there is no real confidence that it will unless in the next 30 days the doubt about the Ford car is removed.

It is generally conceded that the remainder of this year will not be productive of much oil well pipe, and until the mills begin rolling against early 1928 tin plate business, a low rate of tin mill engagement is likely. Some betterment is looked for in wire production, as a result of demands from the agricultural districts, and there are also encouraging reports from the implement industry. The steel trade would like to be hopeful about railroad buying, but outside of the rail and track accessories tangible promises of good future buying are absent.

Steel plant engagement is somewhat improved in the Youngstown district, but for the complete area, including that district, Pittsburgh, Wheeling and Johnstown, the average rate of ingot output has not changed materially.

Steel prices are holding well with some exceptions, but in a market in which demands are for small lots covering the immediate needs of consumers, prices are better described as steady rather than strong.

The primary materials are dull, save for some ac-

tivity in household sizes of coal, which, being unaccompanied by any considerable industrial demand, leaves supplies quite ample and means no marked strength in prices except on the prepared sizes. There seems to be more spot furnace coke than the market can digest, and prices are weaker. Pig iron is firm. Scrap dealers are finding that they must meet customers' price ideas to market their material.

Pig Iron.—The market has lapsed into dullness after the recent comparatively large sales of foundry grade, and there are few producers who now have any sizable inquiries before them. It is patent that consumers either have all the iron bought that they will need in the immediate future or feel that when they need supplies they will be readily available. With only two merchant furnaces in production in the Valleys on the commonly-used grades, production is light enough to warrant more interest in future supplies, and there probably would be if it were not for the fact that the demand for finished steel is not heavy enough to take the steel companies out of the merchant iron market. Prices are fairly steady. It is no longer possible to interest buyers in foundry iron at more than $17.50, Valley furnace, for No. 2, and basic no longer is quotable at more than $17.25. On Bessemer the Valley market is now squarely quotable at $18. Valley low phosphorus iron is quoted at $27.50, but Eastern iron of that grade is selling at a delivered price equivalent to $27, or a few cents less at the Valley. Through an error in transmission the price of Bessemer iron delivered at Pittsburgh was given last week as $19.96; it should have read $19.76, or $18, Valley furnace, plus $1.76, the freight to Pittsburgh.

The average price of Bessemer iron shipped from Valley furnaces in August was $18.31, and of basic, $17.25, according to W. P. Snyder & Co. In July the average prices were $19.50 and $18.50 respectively.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.25
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free	27.50

Freight rate to the Pittsburgh or Cleveland districts, $1.76.

Ferroalloys.—Business is slow, whether viewed from the angle of new orders or specifications against contracts. The common report about the latter is that consumers are reducing, rather than increasing, their monthly quotas, and there are only occasional carloads of the commonly used ferroalloys in the way of new business. Prices are holding.

Semi-Finished Steel.—No quickening is yet noted in the demand for billets, slabs and sheet bars; indeed, business, if anything, is quieter than it has been, as non-integrated sheet and tin plate manufacturers are running at a low rate and are taking out very little steel, while the strip makers seem to have almost enough billets and slabs in stock to take care of current demands upon them. Forging quality steel still awaits an upturn in the activity of motor car builders, but users of skelp and wire rods are ordering shipments against contracts a little more freely. There is no evidence of a change in prices.

Fluorspar.—It usually happens that when consumers of gravel fluorspar begin to evince interest in their winter requirements, as they commonly do at this time of the year, competition grows sharper. This year is proving no exception and, in the efforts of producers to get orders, a price of $16.50 per net ton at mines has become rather common on domestic spar running 85 per cent calcium fluoride and not over 5 per cent silica. Imported spar of approximately the same analysis is freely offered at $16 per net ton, duty paid, c.i.f. Atlantic ports, and, enjoying a relatively low inland rail rate, is said to be penetrating as far west as Cleveland and Wheeling. Steel makers usually stock this material in the fall to escape shipments when the weather is cold enough to freeze it.

Wire Products.—Nails are not moving freely, but manufacturers in this district appear satisfied that other products are as active as can be expected at this time of the year, which ordinarily is a quiet period. The market is an average one compared with the past two years at this season. Prices named on new business are above those in invoices of current shipments, but the trade is looking forward to the fourth quarter to see full establishment of present quotations. Mill operations do not average more than 50 per cent of capacity.

Spring dating terms have been named on woven wire fence in the South, effective Sept. 1.

Rails and Track Supplies.—Not much business is developing in these items for local manufacturers. The stronger tendency in the coal market incident to the revival in the demand for winter household requirements is expected to bring more mines into production and create more activity in light-section rails and small spikes. But the trade is not expecting much buying of standard-section rails and track supplies before the end of the month. Prices are reasonably steady.

Tubular Goods.—Most makers lately have been experiencing some improvement in the demand for butt-welded pipe, which is used chiefly in building construction, now in its active season, and general business is slightly heavier as a result of numerous small-lot shipments of lapwelded pipe from stock that were wanted promptly. But reports of better business are usually qualified by the observation that there is room for more improvement. Pipe makers have become reconciled to the fact that the oil industry will not provide much casing, drill and drive pipe in the remainder of this year. It has been a rather lean year in those kinds of pipe, and with few makers are shipments of buttwelded pipe as large as they were up to this time last year. Some good-sized gas pipe line orders have served to save the year from making a very poor showing. Tube business is below the average of the early part of the year but reasonably steady.

The Iron Age Composite Prices

Finished Steel

Sept. 6, 1927, 2.367c. a Lb.

One week ago	2.367c.
One month ago	2.367c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4:	2.339c.,	Apr. 26
1926	2.453c.,	Jan. 5:	2.403c.,	May 18
1925	2.560c.,	Jan. 6:	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15:	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24:	2.446c.,	Jan. 2

Pig Iron

Sept. 6,1927, $18.04 a Gross Ton

One week ago	$18.13
One month ago	18.13
One year ago	19.46
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4:	$18.04,	Sept. 6
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	Mar. 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c.
F.o.b. Chicago	1.90c. to 2.00c.
Del'd Philadelphia	2.12c.
Del'd New York	2.14c.
Del'd Cleveland	1.99c.
F.o.b. Cleveland	1.80c.
F.o.b. Birmingham	1.95c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.80c. to 1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.

Rail Steel

F.o.b. mill	1.65c. to 1.80c.
F.o.b. Chicago	1.90c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c. to 1.80c.
F.o.b. Chicago	1.90c. to 2.00c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del. Cleveland	1.99c.
Del'd Philadelphia	2.07c. to 2.12c.
Del'd New York	2.09c. to 2.14c.
C.i.f. Pacific ports	2.30c. to 2.40c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c. to 1.80c.
F.o.b. Chicago	1.90c. to 2.00c.
F.o.b. Birmingham	1.90c. to 2.00c.
Del'd Cleveland	1.99c.
Del'd Philadelphia	1.90c. to 2.02c.
Del'd New York	1.90c. to 2.04c.
C.i.f. Pacific ports	2.35c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.30c.
All gages, 6 in. to 12 in., P'gh	*2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net	2.40c.
All gages, narrower than 6 in., Chicago,	2.40c. to 2.60c.
All gages, 6 in. and wider, Chicago,	2.20c. to 2.50c.
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports	$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports	$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c. to 2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.30c. to 2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., f.o.b. P'gh mill	3.25c.
Strips, under 12 in., f.o.b. Cleveland mills	3.25c.
Strips, under 12 in., delivered Chicago	3.55c.
Strips, under 12 in., f.o.b. Worcester mill	3.40c.
Stripsheets, 12 in. and wider, Pittsburgh mill	3.00c.
Stripsheets, 12 in. and wider, Cleveland mill	3.00c.
Stripsheets, 12 in. and wider, del'd Chicago	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.25
Barbed wire, painted	3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.35c.
Nos. 9 and 10, del'd Philadelphia	2.57c.
Nos. 9 and 10, f.o.b. Birmingham	2.40c.

Box Annealed, One Pass Co'd Rolled

No. 24, f.o.b. Pittsburgh	3.00c.
No. 24, f.o.b. Ch'go dist. mill	3.10c.
No. 24, del'd Philadelphia	3.32c.
No. 24, f.o.b. Birmingham	3.15c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.15c.
No. 24, f.o.b. Pittsburgh, B grade	3.95c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.85c.
No. 24, f.o.b. Chicago dist. mill	3.95c.
No. 24, del'd Philadelphia	4.17c.
No. 24, f.o.b. Birmingham	4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill	3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.25c.

Long Ternes

No. 28, 8-lb. coating, f.o.b. mill	4.20c. to 4.30c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C. $11.40	25-lb. coating I.C. $17.30
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		Base Per 100 Lb.
21.00*	(1½% Nickel, 0.10% to 0.20% Carbon)	$2.90 to $3.00
2300	(3½% Nickel)	4.10 to 4.20
2500	(5% Nickel)	5.00 to 5.25
3100	(Nickel Chromium)	3.10 to 3.20
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	6.75 to 7.00
3400	(Nickel Chromium)	6.00 to 6.25
5100	(Chromium Steel)	3.10 to 3.20
5260*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.10 to 4.30
6100	(Chrom. Vanad. spring steel)	3.60 to 3.80
9250	(Silicon Manganese spring steel)	3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.10 to 4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.10 to 3.20
	Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	$36.00 to 38.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80 to $2.90
Spikes, ½ in. and smaller	2.80 to 3.00
Spikes, boat and barge	3.10
Tie plates, steel	2.35
Angle bars	2.75
*Track bolts, all sizes, per 100 count,	70 per cent off list

*Chicago mill prices on large track bolts are shown in Chicago market report.

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	45	32½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

¼	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3⅜ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

Sheets.—Demand does not increase much, but makers are holding firmly to quoted prices. Reports of price weakness appear to apply chiefly to the secondary market, resale prices in many distributing centers being as low as mill prices and in some cases even lower. This is a result of the fact that some of the manufacturers did not insist on prompt acceptance of shipments on orders taken prior to the price advance announced late in April. Since buyers were permitted to defer deliveries, prices that were supposed to have been good only to the end of June continued for some time afterward. The mills are now "holding the umbrella" for the jobbers that took in low-priced purchases. Body makers that ordinarily serve the Ford Motor Co. are yet to appear in the market for sheets for the new car of that company. Otherwise, the demand for body sheets is fairly good. In the common finishes no one grade stands out as doing better than another in sales.

Tin Plate.—Demand for tin plate is on a small scale. Because of light packs of the principal vegetables and fruits, the can makers, who took liberal shipments during the first half of the year, have not found it necessary to supplement those shipments by new purchases. Good growing weather this month may help demand a little, but, generally speaking, the year is regarded as ended so far as packers' can sizes of tin plate are concerned. Salmon are late this year, and the indications point to a smaller pack than usual. There is no change in the base price, but it is not being tested in a market as limited as the present one. Mill operations are under, rather than above, 65 per cent of capacity.

Bars, Plates and Shapes.—There has been some increase in the demand for steel bars, but it loses its significance in the fact that it comes from widely scattered sources and does not suggest much gain in the activity of consuming industries. Plate business is not of a size to give much satisfaction, but the large fabricating shops are busy and providing a good volume of specifications to the mills. The general Pittsburgh market on those products is still 1.80c. On bars that price appears to be maintained to both large and small buyers, but on plates and shapes it is purely a small-lot quotation.

Cold-Finished Steel Bars and Shafting.—Prices still lack uniformity, with the smaller makers still going to 2.20c., base Pittsburgh, for ordinary orders, but with the larger producers and those controlling most of the capacity insisting on 2.30c., base, on all business except that of a few buyers in the Detroit district who, on account of the tonnage purchased, have always bought for less than the general market. All of the small to medium-size contracts for this quarter carry a price of 2.30c., and this sort of business provides the bulk of current ordering, since the large consumers are buying very sparingly.

Hoops, Bands and Strips.—If the automotive industry is going to increase production in the near future, it is not yet apparent in the demand for hoops and bands and hot and cold-rolled strips, which is still of moderate proportions and entirely for early delivery. Prices are firmly maintained.

Bolts, Nuts and Rivets.—August proved a somewhat better month in specifications than July, but still left a sizable gap between bookings and productive capacity. Manufacturers could do more business, but they do not seem disposed to increase their order books at the expense of prices. Indications are that present prices will be continued on fourth quarter business.

Coke and Coal.—The spot coke market has definitely weakened in the past week, and as against some sales last week at $3.15 or more for furnace fuel, $3 has become the maximum and standard grade has sold down to $2.85 per net ton at Connellsville ovens, while less than $4 has been done on some machine-pushed 72-hr. coke. Blast furnaces running on Connelisville coke have not been taking the full quotas on contracts, and it has been necessary to find buyers for the tonnage released. The purchasers, as a rule, have taken the coke for some other purposes than the smelting of ore. Some preliminary negotiations for fourth quarter tonnages of furnace coke have been started, but no actual business has yet been done. There is a belief in some quarters that the coal situation may be strong enough in that period to raise coke-producing costs. Activity continues in household coal, but industrial consumers are still too well stocked to be much interested in fresh supplies.

Old Material.—The past week has brought out no material changes in scrap prices. Heavy melting steel has been sold again at $15.50 to the steel maker who recently took 10,000 tons at that price, and seemingly that is all that can be obtained from mills in this district. A mill that might take on tonnages is offering only $15.25. The market is quotable at those prices, which also are being paid by dealers, who have higher-priced orders to cover at some points in the area. A fair-sized tonnage of blast furnace grades has been sold at $11.50. The regular September list of the Pennsylvania Railroad contains approximately 37,000 net tons of scrap, while there are 3000 tons in a supplementary list.

The September scrap list of the Norfolk & Western Railway contains 3930 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.25 to $15.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	14.50 to 15.00
No. 2 railroad wrought	15.25 to 15.75
Heavy steel axle turnings	14.00 to 14.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.25
Railroad coil and leaf springs	16.75 to 17.25
Rolled steel wheels	16.75 to 17.25
Low phosphorus billet and bloom ends	20.00 to 20.50
Low phosphorus, mill plate	19.50 to 20.00
Low phosphorus, light grade	17.00 to 17.50
Low phosphorus sheet bar crops	19.00 to 19.50
Heavy steel axle turnings	14.00 to 14.50
Electric Furnace Grades:	
Low phosphorus punchings	17.00 to 17.50
Heavy steel axle turnings	14.00 to 14.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	10.25 to 10.75
Rolling Mill Grades:	
Steel car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Rails 3 ft. and under	16.00 to 16.50
Malleable Grades:	
Railroad	15.25 to 15.75
Industrial	14.75 to 15.25
Agricultural	14.25 to 14.75

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count,	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb	2.90
Wire, galvanized soft, base per 100 lb	2.90
Common wire nails, per keg	$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	39.00 to 40.00
Forging, guaranteed	44.00 to 45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.80c.
Sheared	1.80c.
Universal	1.80c.

Wire Rods

	Per Gross Ton
*Common soft, base	$43.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $44. Cleveland mill base, $43.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.50c.
Iron ore, Swedish, average 66% iron,	9.75c. to 10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2 delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.85 to $3.00
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered	9.59 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.60 to 1.90
Mine run gas coal, f.o.b. Pa. mines	2.00 to 2.15
Steam slack, f.o.b. W. Pa. mines	1.25 to 1.35
Gas slack, f.o.b. W. Pa. mines	1.40 to 1.60

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$33.00 to $34.00
Domestic, 16 to 19%	32.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$34.00	12%	$38.00
11%	36.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$26.50	10%	$32.00
7%	27.50	11%	34.00
8%	28.50	12%	36.00
9%	30.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	95c. to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.50 to $17.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75 to $3.00
F.o.b. Chicago	2.85 to 3.10

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Sharp Competition in Structural Shapes —Pig Iron Weaker

CHICAGO, Sept. 6.—Structural awards are a feature of this market, the total tonnage placed this week being close to 10,000 tons. Two orders for railroad bridges account for 3100 tons, of which 2300 tons was placed by the Great Northern. Another noteworthy contract calls for 4000 tons for a bridge across the Ohio River at Paducah, Ky.

Sales of finished steel show a sharp increase, being 120 per cent above the weekly average so far this year. In the meantime mill operations have not been changed, but producers are slowly building backlogs with the result that rolling schedules are already on a slightly more economical basis. Although several large orders for structural material and tanks are included in the sales total for the week, the bulk of incoming business is from widely scattered users. It is noticeable, however, that individual purchases are measurably larger than in the mid-summer months. While there is little to support the belief that a general buying movement is getting under way, there is greater confidence that the trend of business will be upward during the fall, and with that expectation stocks in some lines are being carried in better balance. Purchases by the railroads, except in wire products, are unusually light.

Pig Iron.—Inquiry for Northern iron is well maintained, but it is noted that individual wants of users are smaller than recently. Sales for current requirements are in good volume, but in the present market a purchase of 300 to 400 tons is considered sizable. In total shipments the first week in September will not show well, because of the three holidays. Release orders received after Labor Day indicate, however, that the August rate, which was one of the highest so far this year, is being maintained. It now develops that most of the boat iron sold in this district will be delivered to users in and near Chicago. The bulk of going business to local furnaces is being taken at $19.50, but offers have been made and some business has been accepted at $19, f.o.b., local furnaces. On the whole, prices lack strength.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil.	19.50
High phosphorus	19.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent, copper free	$31.50 to 32.00
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Several carloads of 19 to 21 per cent spiegeleisen have been placed at $33, Hazzard, Pa. Otherwise this market is quiet. Specifications for ferromanganese are in fair volume, but no sales are reported. Users of 50 per cent ferrosilicon are taking out moderate quantities.

Prices delivered Chicago: 80 per cent ferromanganese, $97.56; 50 per cent ferrosilicon, $85 to $87.50; spiegeleisen, 18 to 22 per cent, $40.76 to $41.76.

Plates.—Order books in wide plates have been further enlarged by a purchase of tank material for delivery in the Southwest. The 3500 tons required is to be shipped at the earliest convenience of the mill. Old inquiry for like material totals close to 3000 tons. Although new projects are said to be under way, they have not progressed to the point where a definite tonnage is being sought. Miscellaneous orders for plates are more numerous, but rarely represent the requirements of users beyond the next 30 days. Railroad buying continues to drag bottom. Fresh inquiry this week includes nine gas-electric cars for the Chicago & North Western. The Pullman Car & Mfg. Corporation has taken orders for six diners from the Lehigh Valley and two baggage-mail cars from the Chicago Great Western. Mill prices for plates are unchanged at 1.90c. to 2c., Chicago, but the lower quotation is rapidly becoming the more common even on small orders.

Mill prices on plates per lb.: 1.90c. to 2c., base, Chicago.

Structural Material.—This has been another active week in structural awards, which totaled about 12,000 tons. One shop has booked 5800 tons in four orders, and a bridge plant in Milwaukee has taken 4000 tons for a bridge across the Ohio River at Paducah, Ky. A new project of note is the Civil Courts building at Milwaukee. The first unit, which will be constructed at an early date, calls for 2000 tons, and the complete building will take about 4000 tons. Fabricators in this district are engaged at 70 per cent of capacity. Competition is unusually keen and prices still show a strong tendency to sag, the greatest weakness being shown in beam spans, such as are commonly used for highway bridge work. Stocks at shops are being held at a minimum, and only an occasional order gives evidence that a fabricator is willing to carry steel that is not covered by an actual contract. Mill prices in structural shapes are weak, and in several cases as low as 1.85c., Chicago, has been named to fabricators bidding on large-size projects.

Mill prices on plain material per lb.: 1.90c. to 2c., base Chicago.

Reinforcing Bars.—This market is marking time both in new awards and in fresh inquiries. Most active among the larger projects that are pending is the *Chicago Evening Post* building, requiring 800 tons of bars. Bending shops on the whole are well engaged, and they are meeting the prompt delivery demands of contractors. The price situation remains unchanged. Small lots of billet bars readily bring from 2.65c. to 2.75c. per lb., Chicago warehouse. Orders up to 300 tons each have been taken at 2.30c. to 2.40c., but there has been no test of prices on contracts for 500 tons or more, all recent awards of that size having been made against quotations submitted when prices were lower.

Bars.—The beginning of the new months has brought out a substantial increase in the demand for soft steel bars. Specifications for the week exceed shipments by not less than 75 per cent. Shipping schedules arranged by manufacturers of farm machinery indicate a growing demand from that source, and there has been no cut in the rate of operations among local forgers. The installation of forging equipment by a number of manufacturers is leading some to believe that the capacity of forging units is gaining rapidly on the demand. Mill prices on mild steel bars are steady at 1.90c. to 2c., Chicago. In the bar iron market both new buying and specifications are in larger volume, and prices are holding at 2c., Chicago. Demand for alloy steel bars is steady, and shipping schedules for September indicate that production will hold close to a 70 per cent level in the new month. Shipments of rail steel bars are heavier, being not far behind production, which stands at 70 per cent of local mill capacity. Orders are widely diversified, but a more active demand from agricultural machinery manufacturers and metal locker builders is clearly indicated. The barn equipment industry is running at a steady rate, not having experienced the customary mid-summer lull. Mill prices in hard steel bars are weak at 1.90c., Chicago.

Mill prices per lb.: Soft steel bars, 1.90c. to 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.90c., base, Chicago.

Hot-Rolled Strip.—Specifications are steady, and production is close to 80 per cent of local mill capacity.

Sheets.—Orders are in good volume, although individually small and for immediate shipment. Deliveries from mills range two to three weeks, with a tendency to spread, as specifications exceed shipments by a small margin. Orders from the South are small owing to the fact that supplies are reaching that territory from the upper Ohio River, rather than because of a lack of demand. Local producers are quoting 3.15c., base, for black, 4c. for galvanized and 2.40c. for blue annealed sheets, delivered in Chicago. These prices are moderately strong, but uneasiness is felt over the possibility of competition from makers of wide strip sheets. Pro-

duction is averaging close to 70 per cent of hot mill capacity.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Wire Products.—Demand from the manufacturing trade is slower, and most incoming orders are for delivery in the next 30 days. Business emanating from jobbers is steady as a whole. To the east of Chicago the demand is lighter, but this is offset by larger orders from Iowa, the Southwestern States and points in the lower Mississippi River region. There has been an increase in railroad orders, calling principally for barbed wire and nails. Locally the demand for nails is dull, and nail production stands at 30 per cent of capacity or lower, while in all wire mill products the average is close to 55 per cent. Prospects for an active fall demand are such that producers are enlarging stocks, which are now heavier than at any time in the summer months. Mill prices of wire and wire products are given on page 657.

Rails and Track Supplies.—Word has been passed about that the Chesapeake & Ohio will not close on its inquiry for 55,000 tons of standard-section rails before Sept. 15. The approval of an appropriation for rails by the Chicago, Milwaukee & St. Paul now appears to have been a step taken to meet obligations against an old order and therefore does not indicate the future requirements of that railroad.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36 to $38. *Per Lb.:* Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Bolts, Nuts and Rivets.—From the viewpoint of specifications this market is only moderately active. Producers are out with fourth quarter contracts, some of which have been signed at the existing discounts. Although some contracts for large rivets have been signed at $3.10, Chicago, there is some doubt that this price will hold.

Cast Iron Pipe.—Of outstanding interest in this market is an inquiry by Detroit for 16,500 tons. Bids will be opened on Sept. 10 on 2500 tons of 30-in. Class C, 3000 tons of 36-in. Class C, 6500 tons of 8-in. Class B and 4500 tons of 6-in. Class B pipe. Saginaw, Mich., will receive tenders up to Sept. 6 on 120 tons of 20-in. and 124 tons of 6-in. to 16-in., all Class B pipe. Akron, Ohio, is in the market for 675 tons of 6-in., 315 tons of 8-in. and small lots of 4-in. and 12-in., Class B pipe. Orders from contractors have bulked large in the aggregate, and public utilities are again taking fair tonnages. The National Cast Iron Pipe Co. is low bidder at Kenosha, Wis., on 300 tons of 6-in. and 100 tons of 8-in. Class B pipe in 16-ft. lengths at $36.90, delivered. The freight from Birmingham is $8.50 and the length carries a $1 extra, making the Birmingham price $27.40, based on 12-ft. lengths.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $35.70 to $37.20; 4-in., $39.70 to $41.20; Class A and gas pipe, $4 extra.

Coke.—Shipments of by-product foundry coke continue to expand, and all ovens in this district are lighted. Producers have dropped the 50c. a ton extra asked on spot sales, and all users are now paying $9.75, local ovens, or $10.25, delivered in the Chicago switching district. East of here, largely in the eastern part of Michigan, competition for going foundry coke business has brought out lower prices, at least one producer having named $9, Detroit, representing a cut of 50c. a ton.

Old Material.—Sales in this market are more numerous, and prices of several grades have advanced. A mill has taken a fair tonnage of heavy melting steel at $12.75 a gross ton, delivered, representing an advance of 25c. a ton over the recent low level. A user has purchased close to 1000 tons of cast iron borings at 25c. above last week's price, or at $11.25 a gross ton, delivered. There is still a shortage of this grade, though the situation is less acute than in late August. Several furnaces continue to substitute busheling because of the inability of dealers to furnish borings in the quantities specified in contracts. Steel mills in general are again taking full shipments. With rail-rolling schedules at the low point of the year, there is little doubt that scrap is being used in greater abundance, but it is not clear whether current deliveries are going into production or whether producers of steel are accumulating heavier stocks. Railroad shipments of scrap are a trifle heavier, but yard stocks are not growing, as dealers are having practically no trouble in placing tonnage as it comes out on track. A user has purchased 1000 tons of hydraulic compressed sheets at $11 a gross ton, delivered, or $1.75 a ton below the price recently paid for heavy melting steel. The spread between the two grades is usually $1.50. Several lots of low phosphorus scrap have been taken this week by melters. On the whole, this market is showing only moderate activity, with users generally willing to buy only such tonnage as is required for orders in hand.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.25 to $12.75
Shoveling steel	12.00 to 12.50
Frogs, switches and guards, cut apart, and miscellaneous rails	14.00 to 14.50
Hydraulic compressed sheets	10.50 to 11.00
Drop forge flashings	9.25 to 9.75
Forged, cast and rolled steel car-wheels	15.50 to 16.00
Railroad tires, charging box size	15.50 to 16.00
Railroad leaf springs, cut apart	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.25 to 14.75
Coil springs	15.50 to 16.00
Low phosphorus punchings	14.25 to 14.75
Electric Furnace Grades:	
Axle turnings	12.50 to 13.00
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings	11.00 to 11.50
Short shoveling turnings	11.00 to 11.50
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.25 to 15.75
Cupola Grades:	
Steel rails less than 3 ft	15.50 to 16.00
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Malleable Grades:	
Railroad	13.75 to 14.25
Agricultural	13.00 to 13.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	20.50 to 21.00
Steel car axles	17.75 to 18.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.50 to 10.00
No. 2 busheling	5.50 to 6.00
Locomotive tires, smooth	13.75 to 14.25
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.75 to 15.25
No. 1 railroad cast	13.75 to 14.25
No. 1 agricultural cast	13.25 to 13.75
Stove plate	13.00 to 13.50
Grate bars	11.75 to 12.25
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.05c. to 2.15c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.20
Common wire nails, base per keg	$2.85 to 2.95
Cement coated nails, base per keg	2.95

New York

Fair Volume of Pig Iron Buying—Steel Business Is Spotty

NEW YORK, Sept. 6.—Pig iron sales in the past week, although adversely affected by the holiday interruption, aggregated 7500 tons, an average total for this district. Most of the orders placed were for less than 1000 tons each, indicating that many melters are still buying on a short-term basis. The Moore Brothers Co., Elizabeth, N. J., which was in the market for 750 tons of No. 1X and 500 tons of Bessemer, has closed for most of the tonnage, having placed the business with a Buffalo producer. The price situation shows little change. Although more Buffalo producers are adhering to an advance of 50c. a ton, foundry iron is still available at $16, base Buffalo. The chief change to date has been a more general insistence on silicon differentials. Eastern Pennsylvania foundry iron now ranges from $19 to $20, base furnace, a recent large sale in New Jersey having been placed at $19 base. The report that the Mystic Iron Works booked a large tonnage for delivery to a Virginia pipe foundry is denied. Freight rates from Virginia furnaces to this district were reduced to $4.87 per ton, effective Aug. 29. Other new rates from Virginia are: $3.88 to Baltimore, $4.54 to Philadelphia, and $5.21 to Boston. Barge rates to New York harbor from Buffalo were advanced 50c. to $2.50 per ton, effective Sept. 1. A current inquiry calls for 1500 tons of foundry iron for export.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	$20.91 to $21.41
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn)	18.50 to 19.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Finished Material.—Reports of tonnage taken by mill representatives in this district during August are of a rather conflicting character, but seem to represent a true picture of the steel business. Generally speaking the price situation has shown improvement in the last few weeks, but exception must still be made in the case of structural shapes. Sales of this product continue to be made at prices ranging down to 1.65c., Pittsburgh, but smaller tonnages occasionally bring out $2 to $3 more per ton. Structural bookings in this territory during August fell considerably behind the high July aggregate, but pending work seems to promise ample lettings during the fall months. The bar price is steady at 1.80c., Pittsburgh, but the market is dull. Small tonnages of plates are being sold at 1.80c., Pittsburgh, but large buyers have little difficulty in getting a concession of $1 a ton. The firmness of the sheet price is one of the brightest spots in the market and mills are apparently united in their adherence to 3.85c., 3c., and 2.25c., Pittsburgh, on galvanized, black and blue annealed sheets respectively. Last week's report that there was jobber shading on black and galvanized material to the extent of $2 a ton seems to have been of no moment. Hot-rolled strip is holding at 2.10c. and 2.30c., Pittsburgh and Cleveland, and 3c. represents the bottom of the market on cold-rolled strip. Sales of butt-weld pipe are being maintained at a good rate, but not many mills have been fortunate in securing enough orders to offset the loss of business during the plumbers' strike earlier in the summer. The outlook in the lap-weld market has not improved materially. Demand for wire products is spotty with occasional activity in particular grades required by specialty manufacturers. Early reports from the agricultural industry seem to indicate a better than usual demand for fencing before the end of the year.

Mill prices per lb. delivered New York: Soft steel bars, 2.14c.; plates, 2.09c. to 2.14c.; structural shapes, 1.90c. to 2.04c.; bar iron, 2.14c.

Cast Iron Pipe.—Prices on pressure pipe have weakened at least $1 a ton, now ranging from about $28 to $29, Birmingham, for 6-in. and larger diameters. The General Contracting Co., Bath, Me., which has the contract to lay 3 miles of 30 and 36-in. pipe for Hartford, Conn., has bought concrete, instead of cast iron, pipe. While there is a dearth of municipal business, the market is expected to be favorably affected by fall orders for extensions to be completed before cold weather sets in.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—Reports of August business are somewhat conflicting, but in most cases the month fell behind July, as well as August, 1926, in aggregate

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	5.75c. to 6.25c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
⅓-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	4	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.00c.
No. 22	4.15c.
No. 24	4.20c.
No. 26	4.30c.
No. 28*	4.45c.
No. 30	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.45c. to 4.70c.
No. 18	4.60c.
No. 20	4.75c.
No. 22	4.80c.
No. 24	4.95c.
No. 26	5.20c.
No. 28*	5.45c.
No. 30	5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

tonnage sold. There has been no change in prices, and black and galvanized sheets seem to be the only products showing any notable weakness. Concessions have been appearing on these, but they have not become general enough to represent an actual price reduction.

Reinforcing Bars.—There has been little activity in the last week, with small jobs accounting for nearly all the business taken. Tonnage booked during the month just passed fell far below the July figure. New work that came out during the month in the New York metropolitan territory included only one or two jobs requiring 100 tons or more, and the run of small business was at the usual seasonal level. Prices are unchanged as follows:

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.05c. to 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Coke.—Specifications for foundry coke continue to improve, but demand for spot material is light and prices are unchanged. Foundry coke for prompt shipment ranges from $4 to $4.25 per net ton, Connellsville, while furnace coke remains at $3 to $3.25. Delivered prices on Connellsville foundry coke are: to northern New Jersey, $8.03 to $8.28; to New York or Brooklyn, $8.79 to $9.04; to Newark or Jersey City, N. J., $7.91 to $8.16. Prices on by-product foundry coke are unchanged at $9.59 to $10.77, delivered Newark or Jersey City.

Old Material.—An increase of as much as $1 a ton in the price of iron and steel pipe in small diameters has been practically the only change in the market situation during the last week. This grade is now quotable at $9.25, New York. Dealers' buying prices are unchanged in other cases, but business has been too quiet to provide adequate tests. There is some interest by consumers, but definite inquiry seems slow in developing.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.00 to 8.00
No. 1 heavy breakable cast	11.25 to 12.50
Stove plate (steel works)	8.75 to 9.25
Locomotive grate bars	8.00 to 8.50
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	7.25 to 7.75
Mixed borings and turnings	7.00 to 7.50
Steel car axles	15.75 to 16.25
Iron car axles (nom.)	23.00 to 23.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.25
Forge fire	6.50 to 7.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought, long	10.50 to 11.00
Rails for rolling	10.25 to 10.75
Cast iron carwheels	11.50 to 12.00
Stove plate (foundry)	9.00 to 9.75
Malleable cast (railroad)	10.75 to 11.25
Cast borings (chemical)	11.50 to 12.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to $14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.00

The probable cost of equipping passenger carrying rolling stock owned by 108 of the larger railroads of the country with roller bearings is put at $33,000,000 by research engineers of the Hyatt Roller Bearing Co., a division of the General Motors Corporation. The point is made that the average of $30,000 per year, to fit roller bearings on newly purchased passenger cars, is not high, compared with annual railroad expenditures, taking into account also the easy and smooth starting of trains proved by use of the bearings over a period of several years by some of the leading railroad lines.

Freight car-loadings in the week ended Aug. 20, are reported by the American Railway Association at 1,066,636, the largest total for any week since last November. It exceeded the previous week's 1,049,280 by 1.7 per cent, but was below the corresponding weeks of 1926 and 1925, which registered 1,081,503 and 1,079,995 respectively.

Cleveland

Steel Outlook Better Although Operations of Consumers Show Little Gain

CLEVELAND, Sept. 6.—The first few days of September have brought an improvement in small-lot orders for finished steel with some of the mills, although the holiday period resulted in some interruption in business. The trade looks for an increase in sales this month over August, which made a slightly better showing than July. This belief is based on the expectancy of better business in the fall months rather than on any increase that has so far developed in operations at consumers' plants. Bolt and nut manufacturers and some other industries in the metal-working field look for a gain in their business this month. The automotive industry is still marking time awaiting the appearance of the new Ford cars. While there has been a slowing down in the output of some low-priced automobiles, the industry as a whole appears to be operating at about the same rate as a month ago. Very little new demand for steel is coming from the motor car builders and parts manufacturers, who are limiting their orders to early requirements but are expected to place some business this month for October shipment.

New inquiry for structural steel in the building field is light. While not much work is in prospect, an improvement is expected during the fall months. The market is so well established at 1.80c., Pittsburgh, for steel bars, plates and structural material that buyers are making little effort to secure concessions. The Cleveland price on steel bars is unchanged at 1.80c., mill.

Pig Iron.—Sales fell off in the past week, evidently partly because of the holiday period. Cleveland interests sold 10,000 tons during the week, as compared with 30,000 tons during the previous week. New inquiry is very light. There is little change in the price situation. Cleveland producers are asking $17.50, furnace, for foundry and malleable iron for outside shipment, but it is probable that buyers can still secure a price of $17.25. The market is firmer in Michigan, where there has been some shading from the regular quotation of $18.50, furnace. One producer announces the restoration of that price as a minimum. In the Valley district $17.50, furnace, is commonly quoted. Buffalo is the weak spot in the market, but sellers predict an advance to $17, furnace, by Buffalo producers. Some of the furnaces are starting the month with better shipping orders than in August. While the curtailment of operations by one automobile manufacturer has resulted in a sharp cutting down of pig iron specifications, the automotive industry as a whole appears to be specifying for a little more iron for this month than for August.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.00
Southern fdy., sil. 1.75 to 2.25	23.25
Malleable	19.00
Ohio silvery, 8 per cent	31.50
Basic, Valley furnace	17.25
Standard low phos., Valley furnace	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 3.00c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.65c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Iron Ore.—Water shipments of Lake Superior ore during August amounted to 8,775,990 tons, a decrease of 1,933,270 tons, or 18.05 per cent, as compared with August, 1926, and slightly more than in July, this year, when the water movement amounted to 8,609,082 tons. Shipments up to Sept. 1 were 35,156,495 tons, or 452,657 tons less than during the corresponding period last year. Previous monthly reports of the Lake Superior Ore Association this year have shown larger shipments for the season than during corresponding periods last year. This was due to the early opening of navigation this year and the fairly heavy early season movement. However, with the shipments considerably reduced during the summer months as compared with a year ago, this gain has been wiped out. Shipments during September will show a falling off from August. The Steel Corporation this month has started to reduce shipments by taking off some of the barges of the Pittsburgh Steamship Co. Present estimates are that the season's movement by water and rail will be from 53,000,000 tons to 55,000,000 tons, as compared with 59,979,160 tons last year.

Bolts, Nuts and Rivets.—Some of the bolt and nut manufacturers this week opened their books for the fourth quarter at the present discount of 70 per cent off list. Stove bolts, which take a different discount, are also unchanged. The volume of bolt and nut business during August was practically the same as during July. Manufacturers look for some fall buying this month. The leading local rivet manufacturer does not expect to name fourth quarter prices until Sept. 15. Most consumers of large rivets are getting shipments under contract at $2.75, base, but some carlot business has been placed by non-contracting buyers at $3.

Semi-Finished Steel.—Specifications for September so far have been light, owing to the curtailed operations of sheet mills. Consumers are showing no interest as yet in fourth quarter contracts. Prices are unchanged at $34, Cleveland and Youngstown, for sheet bars and $33 for large billets and slabs.

Sheets and Tin Plate.—Mills are getting few sheet orders, and the demand is only for small lots. No new buying is reported by the automotive industry, and shipments to motor car builders and body plants are moderate, showing no increase over recent weeks. Regular prices are being well maintained, although there are no inquiries of sufficient size to form much of a test of the market. Tin plate is still being shaded $2 a ton, although mills are able to take some carlot business at $5.50 per base box.

Strip Steel.—Some of the mills have opened their books for the fourth quarter for hot and cold-rolled strip at the present prices, but consumers are not yet showing any interest in contracts. Cold-rolled strip is in fair demand, but orders are for small lots. Hot-rolled strip continues very dull. Prices are being maintained.

Reinforcing Bars.—Demand is a little more lively than for some time, and a Cleveland mill during the week took four jobs aggregating over 600 tons. Prices are unchanged at 1.65c., mill, for rail steel bars and 1.80c., Cleveland, for new billet steel bars.

Warehouse Business.—The demand for sheets and other materials used in the building field shows some gain. Other warehouse products are in moderate demand. August sales are slightly better than those in July. Aside from irregularity in reinforcing bars, prices are well maintained.

Coke.—Contracts at the present ruling prices for some of the premium grades of foundry coke are being placed by consumers who had been ordering their fuel as needed without previously renewing contracts that expired July 1. Prices are unchanged at $4 to $5.35, ovens, for Connellsville foundry coke. Heating coke is firmer, ranging from $3 to $3.25, ovens, for prompt shipment. The coal market shows a much firmer tone, which may be reflected later in coke prices.

Old Material.—No improvement has developed in the demand, which is very light, and as a result the market shows a weaker tendency, although quotations are unchanged. Mills have good stocks and dealers have little material to deliver on old contracts, so that the outlet for scrap at present is very limited. Some No. 2 heavy melting steel, which shows less strength than No. 1, has been sold at $13.25, a decline of 25c. a ton. In the Valley district, heavy melting steel and compressed sheet scrap are not so firm as recently. The price range in the former is $15.25 to $15.50, and on the latter, $14.50 to $15.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.00 to $14.25
No. 2 heavy melting steel	13.50 to 13.75
Compressed sheet steel	13.25 to 13.50
Light bundled sheet stampings	11.50 to 12.00
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.75 to 14.00
No. 1 busheling	11.50 to 11.75
Pipes and flues	10.00 to 10.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.00 to 16.50
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling	16.25 to 16.50

Philadelphia

Pig Iron Shows Weak Tendency—Plate Prices Quite Firm

PHILADELPHIA, Sept. 6.—There is apparently considerable expectation that with Labor Day passed, business will begin to show more improvement. Most eastern Pennsylvania mills continue at 60 to 65 per cent of capacity in their operations, and purchasing is still confined to small lots. The No. 2 furnace of the Alan Wood Iron & Steel Co. at Swedeland is scheduled to be blown in Sept. 10. Sellers of blue annealed and black sheets are not a little interested in the rapid progress being made in the production of hot-rolled strip steel in widths up to 36 in., but producers of this material are adhering to regular sheet level to avoid what might develop into severe competitive conditions. Plates continue to show more strength than bars or shapes, although there are no sizable contracts before the market.

Pig Iron.—Recent quotations on lots larger than the general run of orders tend to show a price level slightly under the current $20 base on foundry iron. One tonnage placed last week is understood to have figured back to a furnace basis of about $19 per ton. On most of the current business, however, only carload lots are involved and $20 base is apparently the lowest quotation obtainable. The Baldwin Locomotive Works is expected to close on its inquiry for 2500 tons of floor and cylinder iron within the next two days. No sales

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.65c. to 3.00c.
Plates, ⅛-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)	2.65c. to 3.00c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.35c.
Galvanized sheets (No. 24)	5.20c.
Blue annealed sheets (No. 10)	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

of basic are reported, and $20 per ton, delivered eastern Pennsylvania, is still representative of the market.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.26 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.76
East. Pa. No. 1X	21.26 to 22.26
Basic (delivered eastern Pa.)	20.00
Gray forge	20.50 to 21.00
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	24.50 to 25.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.54
Virginia No. 2X, 2.25 to 2.75 sil.	26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Semi-Finished Material.—The market is quiet, with rerolling billets at $33 to $34 per ton, Pittsburgh, and forging grade at $38 to $39 per ton.

Bars.—Current purchasing is confined to small lots, on which the usual price is 1.80c. per lb., Pittsburgh.

Structural Shapes.—A satisfactory tonnage of structural steel contracts is apparently in preparation and should develop into purchases this month. The market on shapes, however, continues soft. While 1.70c. to 1.75c. per lb., Pittsburgh, is generally quoted, the keen competition among eastern Pennsylvania mills has brought concessions of as much as $2 per ton on desirable orders.

Plates.—Despite the absence of sizable contracts for plates, prices are showing considerable firmness, and although 1.75c. per lb. is still quoted on good specifications, much of the present buying is of small lots, with 1.80c. per lb., Pittsburgh, firmly adhered to by most mills.

Sheets and Strips.—Orders for black and blue annealed sheets are still confined to small tonnages, so that the apparent firmness of the market has not yet been subjected to a real test. Hot-rolled strip steel is quoted on a basis of 2.10c. per lb., base Pittsburgh, for 6 to 12-in. widths and 2.30c. per lb., base, for less than 6-in.

Warehouse Business.—August sales from stock compared favorably with July in total volume, but were not so large as a year ago. There is an inclination to shade prices when large orders are involved, so that bars, shapes and plates have been quoted as low as 2.65c. per lb., base. Sheet prices are fairly firm, with very little tendency to offer concessions.

Imports.—During the past week a total of 5402 gross tons of manganese ore came into the port of Philadelphia, of which 3002 tons was from British West Africa and 2400 tons from Chile. Pig iron totaled only 250 tons, all from The Netherlands. Imports of chrome ore were 4246 tons, all from Portuguese Africa, and 249 tons of spiegeleisen came from France. Steel imports were: Bars, 217 tons from Belgium; structural shapes, 58 tons from France and 12 tons from Germany; bands, 39 tons from France, and steel ingots, 5 tons from Sweden.

Old Material.—There is no definite improvement in business, and dealers still encounter difficulty in filling contracts profitably. No. 1 heavy melting steel is quiet at $14 per ton, delivered, and efforts of sellers to close contracts with mills at 50c. per ton higher have been unsuccessful. Rolled steel wheels are firmer at $16 to $16.50 per ton, and cast iron carwheels range from $15.50 to $16. Chemical borings are quotable up to $16 per ton, with a Wilmington, Del., user paying this price.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.00
Scrap T rails	$13.00 to 13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50 to 12.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00 to 13.50
No. 1 low phos., heavy, 0.04 per cent and under	18.50 to 19.50
Couplers and knuckles	16.75
Rolled steel wheels	16.00 to 16.50
No. 1 blast furnace scrap	10.50
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	10.50 to 11.00
Steel rails for rolling	16.00 to 16.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 16.00

THE large crane bucket, shown in comparison with a small bucket, is over 17 ft. high and has a capacity to handle 236 cu. ft. in volume and 15 tons in weight. It is of the rope-reeved type, substantially constructed and equipped with manganese steel lips.

Two of these buckets are in use at the ore yard of the Inland Steel Co. at Indiana Harbor, Ind., one each for two bridge cranes that were added to the dock equipment when the company constructed its latest blast furnace. The bridges, which rank among the largest ever built, each have a main span of 265 ft. with a 65-ft. cantilever on one end, and a 99 ft. movable apron extension at the other end, providing a total trolley travel of 429 ft. The hoisting speed when loaded is 250 ft. per min., the trolley travel speed is 800 to 1000 ft. per min., and the bridge travel is 50 to 75 ft. per min. The bridge is said to have sufficient power to travel against a wind blowing 40 miles per hour.

Both bridge travel and operation of the bucket are controlled from a man trolley. The bridge is held in any desired position by hand-operated controls located at each end of each crane sill. A power-travel and power-hoist monorail has been provided for lifting parts for repair work on the trolley. The bridge cranes were constructed by the McMyler-Interstate Co., Cleveland.

San Francisco

Bethlehem Shipping Steel to Pacific Coast On Its Own Carriers

SAN FRANCISCO, Sept. 3 (*By Air Mail*).—Outstanding among developments of the week has been an announcement by the Bethlehem Steel Co. that it will ship steel on its own carriers from Atlantic ports via the Panama Canal to the Pacific Coast. The California-Maryland Steamship Co. is the official name of the intercoastal steamship company handling Bethlehem steel products. It is also known as the Calmar line. It is understood that this company has bought six ships from the Garland line, and that in addition to chartering four other vessels it will use two ore boats in its intercoastal service, thus making a total of 12 ships. This action on the part of the Bethlehem Steel Co. is understood to have been taken because of the recent advance in ocean freight rates, which, it is believed, made it difficult for it to compete on an equal basis with the leading interest.

Other features of the week include an announcement by a San Francisco construction syndicate that it has received a permit from the War Department, Washington, for the construction of a proposed bridge across San Francisco Bay from Coyote Point, San Mateo County, to a point on the Alemeda County shore west of Mount Eden. It is stated that work on the proposed structure will start in about 30 days and that the bridge will be opened in about 18 monhs. The plans call for a structure to carry steam and electric railroad traffic and vehicles. The estimated cost, exclusive of land purchases and the construction of highways leading to the bridge, is about $7,500,000.

During the week local importers brought in the following: 1000 tons of English coke, 550 tons of Indian pig iron, 1425 rolls of wire netting, 900 reels of barbed wire, 200 kegs of wire nails and 100 tons of channels.

Pig Iron.—A local importer brought in 300 tons of Indian iron during the week and also unloaded 250 tons in Los Angeles. Local sales are confined to small quantities. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings of fabricated structural steel during the week total 1960 tons; fresh inquiry calls for 530 tons. The largest individual letting, 800 tons for a Y. M. C. A. building in San Francisco, was taken by the Judson Mfg. Co. of this city. Structural work at the San Francisco airport will require 220 tons. Eastern mills continue to quote plain material at 2.40c., c.i.f. Coast ports. Rumors of price shading are not uncommon, but confirmation is lacking.

Plates.—Activity in this department of the market is confined to lots of less than 100 tons. No inquiries of importance have come up during the week. Small buying of plates has been conspicuous during the past few weeks. Eastern mills continue to quote 2.40c., c.i.f. Coast ports.

Bars.—While local reinforcing bars jobbers have a good deal of work in hand, most of it is for individual jobs calling for less than 100 tons. In San Jose, Cal., 100 tons for a monastery building was taken by Badt-Falk & Co., San Francisco. The Grass Valley Irrigation District, Grass Valley, Cal., will take bids Sept. 22 on 361 tons for dam work, and in Sacramento, Cal., the State Highway Commission is taking bids on two jobs totaling 397 tons. Local concrete bar jobbers quote as follows. 2.75c. to 2.85c., base, per lb. on lots of 200 tons, and 3c. to 3.10c., base, on less-than-carload lots.

Cast Iron Pipe.—Public lettings during the week include the following:

FAIRVIEW, ORE., 162 tons, 2 and 6-in. Class B pipe to an unnamed firm.

BURLINGAME, CAL., 706 tons, of which 500 tons of 8, 10 and 12-in. Class 350 pipe was awarded to the American Cast Iron Pipe Co., and 206 tons of 14 and 16-in. Class B pipe was placed with the United States Cast Iron Pipe & Foundry Co.

SAN DIEGO, CAL., 156 tons, street improvement work, 6 to 10-in. Class C pipe, to an unnamed company through Bert Noble, general contractor.

Pending jobs included the following:

PASADEMA, CAL., 1304 tons, bids in.

SANA ANA, CAL., 373 tons, 4 and 8-in. Class B pipe; bids, Sept. 12.

BUENA PARK, CAL., 269 tons, 8-in. Class B pipe, for the Buena Park Sanitary District.

VENTURA, CAL., 222 tons, 4 to 30-in. Class B pipe; United Concrete Pipe & Construction Co. low bidder.

SANTA MONICA, CAL., 183 tons, 4 and 6-in. Class B pipe; bids, Sept. 15.

SEBASTOPOL, CAL., 231 tons, 4 to 10 in. Class B or welded pipe; bids, Sept. 12.

BELLINGHAM, WASH., 1600 tons, 4 to 20-in. Class A or centrifugal pipe; bids, Sept. 15.

VANCOUVER, B. C., 450 tons, 4500 ft. of 18-in. pipe, thickness of wall 1¼ in., for the Greater Vancouver Water District; bids Sept. 29.

Steel Pipe.—An unnamed producer has taken 380 tons of 3½-in. line pipe for the Pacific Gas & Electric Co., San Francisco. In Los Angeles the Grinnell Co. of the Pacific is low bidder on 531 tons of 6-in. seamless pipe for the municipality. The Monongahela Tube Co. has been awarded 265 tons of 3-in. standard pipe by Clackamas, Ore.

Warehouse Business.—The approach of Labor Day has retarded buying locally. Orders during the past fortnight have been numerous, but the amount of steel called for has been small. Quotations are unchanged.

Coke.—A local importer brought in 1000 tons of English coke during the week. Quotations on English beehive fuel have been reduced locally $1 a ton, because of a slight reduction in ocean freight rates from English ports. Quotations on foundry coke are as follows:

English beehive coke, $15 to $16 per net ton at incoming dock; English by-product, $12 to $13, and German by-product, $11.50 to $12.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.10c.
Small angles, ⅞-in. and over	3.10c.
Small angles, under ⅞-in.	3.60c.
Small channels and tees, ¾-in. to 2¾-in.	3.70c.
Spring steel, ¼-in. and thicker	5.10c.
Black sheets (No. 24)	3.85c.
Blue annealed sheets (No. 10)	4.90c.
Galvanized sheets (No. 24)	5.45c.
Structural rivets, ½-in. and larger	5.50c.
Common wire nails, base per keg	$3.45
Cement coated nails, 100-lb. keg	3.45

St. Louis

Large Pig Iron Sales—Record Shipments of Sheets, Plates, Tin Plate

ST. LOUIS Sept. 6.—Buying of pig iron took another spurt this week, and sales of the Granite City maker totaled 12,000 tons. This included 4000 tons for a radiator manufacturer for shipment during the next three months and 3000 tons of 8000 tons placed by the Standard Sanitary Mfg. Co. for its Louisville, Ky., plant. The local maker sold its part of the Louisville

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.35c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

order on a delivered basis, and shipments probably will be by barge. Other sales included 300 tons to an Illinois stove manufacturer and 250 tons to a Wisconsin implement maker, the latter for immediate shipment. The market is firm, with prices unchanged. Local foundries report better business.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	21.66
Southern No. 2 fdy., delivered	21.67
Northern malleable, delivered	21.66
Northern basic, delivered	21.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—The Granite City mill reports that its shipments of sheets, plates and tin plate last month were the heaviest for any August in 10 years, and that orders on hand for these commodities are sufficient to sustain full capacity operations for several weeks. Mill prices are being well maintained. Railroads have given no indication as to their steel requirements for the remainder of the year. A leading warehouse interest reports that its business for last month was 2½ per cent larger than in July and 5 per cent larger than in August, 1926.

Coke.—Metallurgical coke continues in good demand, as consumers continue to build up their reserve stocks to meet any emergency that may arise from the coal strike. Increased foundry melt in this district is also making for better demand. Buying of domestic grades is better than at any time this summer, and dealers are taking an increased interest in laying up stocks for the winter.

Old Material.—The market is firm at unchanged prices. A substantial tonnage of such items as heavy melting steel, melting rails and rails for rerolling is reported to have been sold to East Side interests. Consumers in this district continue to buy material as they receive orders for their finished products. The outlook is said to be good for the early placing of substantial orders by the mills in the district. Stocks in the hands of dealers are said to be small. Railroad lists include: Pennsylvania, 41,000 tons; Baltimore & Ohio, 22,000 tons, and St. Louis-San Francisco and Missouri Pacific, 250 tons each.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.25 to $12.75
No. 1 locomotive tires	14.25 to 14.75
Heavy shoveling steel	12.25 to 12.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.75 to 15.25
Railroad springs	15.25 to 15.75
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	12.25 to 12.75
No. 1 busheling	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Iron rails	12.50 to 13.00
Rails for rolling	15.50 to 16.00
Machine shop turnings	6.75 to 7.25
Steel car axles	19.00 to 19.50
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	20.00 to 20.50
No. 1 railroad wrought	11.00 to 11.50
Steel rails, less than 3 ft	15.50 to 16.00
Steel angle bars	12.75 to 13.25
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	13.50 to 14.00
No. 1 railroad cast	14.50 to 15.00
Agricultural malleable	12.50 to 13.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

A line of frequency changers, in sizes from 5 to 100 kw. for frequencies of 80, 90, 100 and 120 cycles for wood-working machinery, and 180 cycles for metal-working or for high speed portable tools, has been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Features of the machine are sealed sleeve bearings, a welded bed-plate, a flexible coupling, die-cast brushholders, rigid brackets and double impregnated insulation.

The La Belle Works of the American Sheet & Tin Plate Co., an 8-mill tin plate plant, at Wheeling, W. Va., is expected to shut down in the next 30 days for an indefinite period. This plant has been engaged entirely on tin mill black since it was put back in operation, Dec. 1, 1926, following a suspension of almost 2½ years.

Youngstown

More Cheerful Feeling in Steel Market—Heavy Melting Scrap Weaker

YOUNGSTOWN, Sept. 6.—A more cheerful feeling is developing in the local steel market, and since it is supported by slight, but distinct, gains in orders and some increase in plant activities, the belief is that a turn is at hand. Ingot production, making allowance for the fact that yesterday, Labor Day, was generally observed as a mill holiday, will be at the rate of 65 per cent of capacity this week, which is slightly above the average of the past few weeks. Sheet makers still complain of slow business, but the report as to sales of other finished steel products is in the main fairly cheerful. Buttwelded pipe is moving well, and there has been a distinct, though slight, increase in the orders for steel bars. Incidentally, one good-sized lot of steel bars was sold by a local maker at 1.85c., base Pittsburgh, and while 1.80c. remains the ruling price, it also appears to be the minimum, even to buyers who ordinarily enjoy some price preference.

Pres. James A. Campbell of the Youngstown Sheet & Tube Co. expresses the belief that, now that the vacation period is ended, business will get more serious attention from industrial leaders and that the steel market will share in the improvement that is likely to result. Pres. William G. Clyde of the Carnegie Steel Co., who was here last Friday on a periodic visit to the Youngstown district plants of that company, also is looking for better business, particularly from the automobile industry, which he believes will soon get into a more active stride. He does not subscribe to the common notion that the relatively dull situation in the motor car industry is due to the failure of the new Ford car to reach the market. This new car is naturally awaited by those interested in cars of the lower-priced class, but, in his opinion, it is not going to affect materially the sales of the more costly cars. The automobile industry is merely going through that quiet period that usually accompanies the ending of one series and the introduction of another.

Steel pipe makers appear to have discounted the likelihood of a slow market for the remainder of this year in oil country goods and are disposed to make the best of a relatively good sale of buttwelded pipe and the fact that the gas industry still is taking considerable tonnage of line pipe. The latter demand has been one of the saving factors of the pipe business, and without it the year's showing in pipe would be a sorry one. Sheet makers admit encountering some price cuts in various markets, but do not regard them as indicating any weakening in the general price structure, which they insist is more generally adhered to than usually is the case.

The primary materials are showing few developments of interest. Pig iron at present levels is believed to be about as low as it can go and still let producers out without loss. Heavy melting steel scrap, which was recently held as high as $16.50, although it did not sell that high to any of the consumers in the district, is definitely back to $15.50 to $15.75, and is fairly plentiful at that range. Melters are more concerned about the supply of compressed and bundled sheet scrap. Both grades are freely used in this district, and the diversion of much of the Detroit production to Cleveland and Buffalo by water is now being felt here, especially as current production in Detroit is light in keeping with the output of automobiles. Usually $1 to $1.50 a ton below the price of heavy melting steel, compressed sheets are now commanding within 50c. a ton of that grade.

Steel companies in the district are well off in coal reserves and are not much disturbed about the stronger tendencies in the coal market resulting from an improved demand for household requirements. The Youngstown Sheet & Tube Co. has more than quadrupled the output of its Nemacolin Mine, Nemacolin, Pa., in the past few years, and the labor conditions there are exceptionally favorable, as a result of steps taken to make the community an attractive place in which to live.

Toronto

More Inquiries for Fourth Quarter Pig Iron — Changes in Montreal Scrap

TORONTO, ONT., Sept. 6.—Sales of foundry and malleable pig iron in this market during the past week have been on a par with totals for previous weeks, but in all cases business has been confined to orders for spot delivery. Producers have not opened their books for last quarter despite the fact that inquiries for that period are becoming fairly numerous. It is now estimated that fourth quarter business will equal if not exceed that of other quarters this year. Prevailing low prices are having their effect on the market. Although a number of melters appear rather anxious to get their last quarter contracts on the books of producers, the latter are putting off transactions of this nature as long as possible. Local blast furnace representatives are counting on higher prices within the next two or three weeks. If advances go into effect in the United States markets, it is almost certain that they will be reflected in higher prices in Canada. As prices now stand, there is one producer at least who is out of the market and refuses to quote on iron outside of small tonnages for immediate delivery. Notwithstanding low prices the production of pig iron in Canada has been showing improvement within the past three weeks, and it is expected that when August figures are available they will show an output equal to that of April and May.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	26.00
No. 2 foundry, sil. 1.75 to 2.25	26.00
Malleable	26.00
Basic	25.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Following the recent reduction in Toronto prices, Montreal dealers have made a general revision in their buying price lists. Wrought iron and steel axles and plate and shape shearings have advanced $2 per ton in that market, owing to a stronger demand, together with a general falling off in the supply for current needs. Other materials that are more plentiful in that market and for which there is a comparatively light demand have declined in price from 50c. to $3 per ton. Orders against contract are being received on schedule, and these, together with spot purchases, are resulting in a good movement of old material between Canadian dealers and consumers.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.50	$9.00
Rails, scrap	10.00	10.00
No. 1 wrought	10.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	8.00
Cast borings	7.50	6.00
Steel turnings	7.00	7.00
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	17.00
Stove plate	....	12.50
Standard carwheels	....	16.00
Malleable scrap	....	14.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Issue Map Showing Ore Distribution

The Lake Superior Iron Ore Association, Cleveland, has issued a map showing the distribution of iron ores during 1926. This includes ore shipments by Eastern mines and receipts of foreign ores. The flow of ore to the various consuming districts and furnaces in volume and the routing are graphically indicated in colors, while figures give in round tonnages the amounts going to the various districts. On the map are also listed the names of all consumers tabulated by districts and the number of furnaces they operate.

Boston

Little Pig Iron Sold but Prices Appear Firmer — Scrap Advances Hold

BOSTON, Sept. 6.—As is usual during the week preceding Labor Day, pig iron sales dropped to a few 100-ton orders, mostly from jobbing foundries. Prices on iron from Buffalo, as well as from furnaces east of Buffalo, appear firmer. Eastern New York State iron is selling on a basis of $18 a ton, furnace, for No. 2 plain, with the usual 50c. a ton differential for No. 2X, while the Mystic Iron Works has taken business at a minimum of $19 a ton, furnace. These prices represent an advance of 25c. to 50c. a ton as compared with a month ago. Buffalo furnaces are holding to recently established prices. So little Pennsylvania, Virginia and Alabama iron is moving that it is difficult to ascertain ruling prices. Dutch iron is quoted at $22 a ton on dock here, regardless of silicon content. Furnaces east of Buffalo are still piling iron, a fact which raises the question whether current prices would stand the test of large inquiries.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.41
Buffalo, sil. 2.25 to 2.75	21.41 to 21.91
East. Penn., sil 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	26.21
Virginia, sil. 2.25 to 2.75	26.71
Alabama, sil. 1.75 to 2.25	24.16 to 26.02
Alabama, sil. 2.25 to 2.75	24.66 to 26.52

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 from Virginia, $6.91 to $8.77 from Alabama.

Reinforcing Bars.—Comparatively little large business is coming on the market, and when it does, competition is very keen. A grist of small tonnages is being bought weekly, and most sellers are adhering closely to 2.70c. per lb., warehouse.

Coke.—Specifications against last half contracts for New England by-product foundry coke continue to expand, although the net gain in tonnage for the week was not large owing to the holiday. Ovens expect the gain in specifications from now on to be much more rapid, as many foundries have booked considerable business for September and October delivery. The New England Coal & Coke Co. and the Providence Gas Co. still quote foundry fuel at $12 a ton, delivered, within a $3.10 freight rate zone.

Warehouse Business.—The movement of iron and steel products out of warehouses in the latter part of August fell off noticeably; yet the month as a whole compared favorably with August, 1926. Warehouse stocks are well assorted, but not burdensome. Warehouse prices are reported as firm. Indications are that fewer changes will have been made in warehouse prices in 1927 than in several recent years.

Old Material.—Business in old material is fairly good, but no better than it was a week ago. The anticipated advance in prices for certain materials has not developed. Recent sales include heavy melting steel classified as No. 2 at $8.30 a ton, on cars, for New

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

England consumption and yard steel at $7.60 for Pennsylvania consumption. No. 1 heavy melting steel, for New England consumption, brings around $9.25 a ton, on cars, but for Pennsylvania delivery the market is 50c. to 75c. a ton higher at least. Going prices on bundled skeleton are usually around $6.60 a ton, on cars; on cotton ties, $5.50; on stove plate, $8.25; on steel turnings, $6.60. Local brokers report that the Mystic Iron Works is not in the market for material. The Boston & Albany Railroad, on Sept. 2, closed bids on 500 tons of heavy melting steel, 100 tons of No. 1 wheels and about 15 cars of miscellaneous material.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.50 to $10.00
Scrap rails	8.00 to 8.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	6.25 to 6.60
Cast iron borings (steel works and rolling mill)	6.50 to 7.10
Bundled skeleton, long	6.25 to 6.60
Forged flashings	6.50 to 7.00
Blast furnace borings and turnings	6.25 to 6.50
Forged scrap	6.00 to 6.50
Shafting	13.50 to 14.00
Street car axles	16.00 to 16.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.00 to 7.60
Rails for rerolling	10.00 to 10.50
Cast iron borings, chemical	10.10 to 10.60

Prices per gross ton delivered consumers' yards:

Textile cast	$15.00 to $15.50
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	11.00 to 12.00
Railroad malleable	14.50 to 15.00

Buffalo

Pig Iron Demand Subsides—Mill Removes Embargo on Scrap Shipments

BUFFALO, Sept. 6.—Pig iron buying has fallen off, and no sizable inquiries are pending. One order recently placed was for 200 tons of foundry, and another called for 300 tons of the same grade. It is reported that an order for 500 tons of malleable was also placed. One furnace has announced a $17 base for foundry, but in the main makers are adhering to $16.50 base, with $17 generally quoted on malleable. The price situation is stiffening, and silicon differentials are apparently being adhered to.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$16.00 to $16.50
No. 2X foundry, sil. 2.25 to 2.75	16.50 to 17.00
No. 1X foundry, sil. 2.75 to 3.25	17.50 to 18.00
Malleable, sil. up to 2.25	16.50 to 17.00
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operations are slightly better. Prices on soft steel bars are steady at 2.065c. per lb., Buffalo, for most lots. Inquiry is fair for bars and shapes. Sheet prices at 3c., Pittsburgh, for black and 3.85c. for galvanized are very firm, and sheet mills are operating well. Business is good in bolts and nuts and fair in pipe. The reinforcing bar market continues active, with a 700-ton job to be let by the city of Buffalo the feature. A large furniture storage warehouse is to be erected in Buffalo, but the amount of steel that will be required has not yet been estimated.

Old Material.—No transactions of importance have occurred in the past week, but market sentiment has improved. Mill operations are somewhat better, and one of the principal consumers of scrap has removed an embargo on shipments which had been in effect for several weeks. Sales of heavy melting steel have been at a minimum, but some small orders for knuckles and couplers and coil springs have been placed at unchanged prices. A number of sales of cast iron borings for blast furnace purposes have livened up the market. Lists advertised by the New York Central, the Michigan Central and the Erie closed last Thursday, and a Pennsylvania Railroad offering closed the first of this week.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.00
No. 2 heavy melting steel	14.00 to 14.25
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets	12.25 to 12.50
Hand-bundled sheets	9.00 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.75 to 16.25
Railroad coil and leaf springs	17.00 to 17.50
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	15.00 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast	15.25 to 15.75
Stove plate	13.50 to 14.00
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Cincinnati

Pig Iron More Active—Heavy Melting Scrap Declines 50c.

CINCINNATI, Sept. 6.—Pig iron buyers are manifesting greater interest in covering fourth quarter requirements, the amount of inquiry before the trade having stimulated activities. Attention still centers on the recent purchases of the Standard Sanitary Mfg. Co. for its Louisville plant. This business was divided between a northern Ohio seller, a Granite City, Ill., maker and a Southern furnace at a delivered price of $20.89 on No. 2X grade. Southern Ohio interests refused to go under $19, base Ironton, even though it is understood that they could have had a substantial portion of the tonnage at the figure which actually was paid. Sales of Southern iron on the basis of $17.25, Birmingham, have been light, while Tennessee iron at $18, base Birmingham, has been moving slowly. Orders for silvery iron have been confined to single car-

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

loads at $28.50, base Jackson, for 8 per cent. A central Ohio melter has contracted for 700 tons of Northern foundry iron. Among current inquiries are 1500 tons of foundry iron for a Hamilton, Ohio, company, 500 tons for the Lunkenheimer Co., Cincinnati, and 500 tons for a Coldwater, Ohio, consumer. The Belfont furnace of the Belfont Steel & Wire Co., Ironton, Ohio, will go into blast within a few days.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	$20.89
So. Ohio malleable.....$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25...	20.94
Alabama fdy., sil. 2.25 to 2.75...	21.44
Tennessee fdy., sil. 1.75 to 2.25..	21.69
Southern Ohio silvery, 8 per cent	30.39

Freight rates: $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—By-product foundry coke specifications are at the lowest point since early in July, and shipments during September are not expected to exceed those in August. Slack operations by consumers in the automobile industry are responsible for this unsatisfactory condition. Local foundries dependent upon the machine tool trade for business also are badly in need of orders and consequently are taking little coke. Prices of beehive furnace and foundry grades from the New River and Wise County fields are firm and unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—Heavy melting steel has declined 50c. a ton, and several other items are showing a weak tendency. The Portsmouth, Ohio, works of the Wheeling Steel Corporation is reported to have bought 10,000 to 15,000 tons of melting steel at a delivered price of $15.75, which is 25c. a ton less than dealers had expected to obtain. Steel plant operations in this territory are on a restricted basis, and buyers are not interested in anticipating future needs. Cast iron grades are lagging. The David J. Joseph Co. has announced the opening of its yards at Portsmouth, Ohio, which have been idle for the past two years. The Big Four railroad is said to have secured good prices for scrap which it sold last week.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....$12.00 to	$12.50
Scrap rails for melting..... 13.25 to	13.75
Loose sheet clippings..... 9.00 to	9.50
Champion bundled sheets..... 9.50 to	10.00
Cast iron borings..... 9.00 to	9.50
Machine shop turnings..... 8.00 to	8.50
No. 1 busheling..... 10.50 to	11.00
No. 2 busheling..... 7.50 to	8.00
Rails for rolling..... 14.00 to	14.50
No. 1 locomotive tires..... 14.25 to	14.75
No. 1 railroad wrought..... 12.00 to	12.50
Short rails ..... 17.75 to	18.25
Cast iron carwheels..... 13.50 to	14.00
No. 1 machinery cast..... 17.50 to	18.50
No. 1 railroad cast..... 14.50 to	15.00
Burnt cast ..... 8.50 to	9.00
Stove plate ..... 10.00 to	10.50
Brake shoes ..... 10.25 to	11.00
Railroad malleable ..... 13.00 to	13.50
Agricultural malleable ..... 12.50 to	13.00

Detroit Scrap Prices Unchanged

DETROIT, Sept. 6.—There have been no changes in the scrap market in this district in the past two weeks, and prices are holding firm. Pig iron shipments for August were about the same as in July, and indications are that they will go slightly above this figure during the present month.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel .....$12.50 to	$13.00
Borings and short turnings..... 9.00 to	9.50
Long turnings ..... 8.00 to	8.50
No. 1 machinery cast..... 17.00 to	18.00
Automobile cast ..... 18.50 to	19.50
Hydraulic compressed sheets.... 11.25 to	11.75
Stove plate ..... 11.50 to	12.50
No. 1 busheling..... 10.50 to	11.00
Sheet clippings ..... 7.75 to	8.25
Flashings ..... 10.50 to	11.00

NEW TRADE PUBLICATIONS

Turbines.—General Electric Co., Schenectady. Bulletin of 12 pages featuring turbines of 2000 to 6000 kw. designed to operate with steam pressure up to 400 lb. and temperatures up to 700 deg. Fahr. Installation views and sectional drawings illustrate the text.

Electric Heat In Industry.—Edison Electric Illuminating Co., Boston. Four-page folder devoted to the use of electricity as a means of heating materials in process of manufacture. Three or four different topics are taken up in the bulletin.

Handling Muriatic Acid.—Duriron Co., Dayton, Ohio. Three-page folder relating to the use of acid-resisting metal in both stationary and portable tanks for handling muriatic acid.

Better Castings.—Nugent Steel Castings Co., Chicago. Two-page bulletin No. 96 featuring the influence of better sands on improvement of castings. Particular qualities of the sands are discussed.

Forging Die Design.—National Machinery Co., Tiffin, Ohio. Machine Talk No. 63 illustrating outboard bearings on heading and gripping slides of forging machines, and describing their advantages.

Radio as Advertising Medium.—Metropolitan Life Insurance Co., New York. 16-page pamphlet giving experience of a number of users of radio for promoting the sale of goods or services. One opinion stressed is that radio can be used only as a goodwill builder. Some facts are given regarding circulation by this means.

Collecting Ash and Dust.—American Blower Co., Detroit. Bulletin 1028 of 12 pages describes and illustrates apparatus to collect cinders, fly-ash and dust and keep them from getting into the air or into machine parts. The Sirocco collector is made in 23 sizes for a wide variety of uses.

Single-Phase Motors.—Century Electric Co., St. Louis. Folder of 4 pages devoted to repulsion-start induction single-phase motors. Both the stator and the field are described, with illustrations.

Creeper Model Loaders.—George Haiss Mfg. Co., Inc., 141st Street and Park Avenue, New York. Catalog No. 527 of 32 pages, describing and illustrating the features of the company's creeper model path-digging loaders. General features emphasized are the powertul digging action, positive self-feeding and continuous crowding. Specifications are given and a section is devoted to information for determining the relative economy of loader installations.

High Speed Automatic Screw Machines.—Brown & Sharpe Mfg. Co., Providence. Leaflet devoted to the features of the company's motor-driven high-speed automatic screw machines, automatic turret forming machines and automatic screw threading machine.

Electric Melting Pots.—General Electric Co., Schenectady. Bulletin of two pages describing electric melting pots for solder, lead, babbitt, type metal, and similar alloys.

Ash Conveyor.—Conveyors Corporation of America, 326 West Madison Street, Chicago. Pamphlet of 16 pages illustrating and describing a steam jet ash conveyor in which, it is stated, "Nothing moves but the ashes." Illustrations include both installation views and blueprints.

Material-Handling Equipment.—Jeffrey Mfg. Co., Columbus, Ohio. Catalog 433 of 46 pages illustrates and briefly describes a wide variety of machinery and equipment for handling materials of all sorts—packages, bulk materials, barrels, etc. Particularly interesting is the showing made in handling automobile bodies in process of assembly. Many of the illustrations were taken in plants of users.

Coal Products Tree.—Koppers Construction Co., Pittsburgh. A wall chart showing the way in which coal, coming up out of the ground through the roots of the "tree," goes out through the branches into varying kinds of products of great diversity. The different branches are labeled with the primary products obtained from coal, such as coke, tar, gas, ammonia, etc., while the smaller branches are the sub-products and the final articles of commerce are shown as fruit.

Guided Expansion Joint.—Gradon Mfg. Co., East Tioga and Memphis Streets, Philadelphia. Bulletin 708 of four pages describes and illustrates a guided expansion joint designed to maintain alinement and give long service without repacking. They are made from 2 to 24-in. pipe sizes, for pressures up to 250 lb. and for temperatures not over 700 deg. Fahr.

Prerequisites of Successful Polishing

(*Concluded from Page* 645)

Polishing Tools

Polishing wheels, unfortunately, have been considered and purchased altogether too much from the standpoint of merchandise. The fact that they are tools of considerable importance has been somewhat lost sight of. In their manufacture, too much consideration has been paid to something to sell at a competitive price, rather than to the development of the tool itself in proper relationship to the work it is to do.

A wheel which has high spots on it, or is uneven on the face, will present only a part of the abrasive head to do the cutting. As a result the operator has to employ more time to reduce a given amount of metal—and time as represented by operators' wages is the most costly item in the whole operation of polishing.

A factor in wheel economy is the diameter and width of face of wheels. It is advisable to use a wheel as large in diameter as the article being polished will permit, thus to secure the maximum contact of the wheel with the work necessary to remove the greatest amount of metal at each stroke. Large wheels have less tendency to overheat than small wheels. Heat is generated only at the point of contact between the wheel and the work. On the large wheels the heated area has a greater opportunity to cool before returning to contact with the work.

It is also advisable, where possible, to use a face much wider than the piece being polished, so that the piece may be moved about on the face of the wheel and not wear the head in one spot. The use of wheels of large diameters and wide faces reduces the investment in wheels, because of the smaller number required. It reduces the cost of caring for wheels, and of reheading them. It also reduces the time lost by operators in changing wheels.

Abrasives

The abrasive grain, which does the actual cutting, is one of the two most important prerequisites of polishing. Glue is the most important, and the grain is secondary only because the grain cannot be given a chance to do its best work unless firmly bonded to the wheels by the glue. There are two kinds of abrasive grains in common use—emery, which is a natural product, and grains which are manufactured from bauxite.

For flexible-grinding operations, the manufactured abrasives are far superior to emery. Examined under the glass, the manufactured grain appears much like sharp pebbles, uniform in size and containing no foreign matter. It differs from emery in being more uniform in hardness or temper. Each grain is so constructed that when properly bonded to the wheel it will fracture away piece by piece, each fracture presenting a fresh cutting edge until the grain is consumed. Wheels headed with manufactured abrasives have less tendency to glaze than those headed with emery.

An important feature in handling grains is the proper consistency of the glue for the different sizes of grains. If the glue is too thin for coarse grains, it will not provide the proper body to hold the grains. If the glue is too thick for the finer grains, the cut of the grains will be modified, a glazed condition of the wheel face will result, and wastage occur.

Glue

Glue is the most important prerequisite of polishing. When it is realized that the abrasive glued to polishing wheels have to perform practically the same operation of grinding away or tearing down metals as solid, vitrefied wheels do, it will be evident that glue, as the bond between the wheels and the abrasives, is the most important factor in polishing. The efficiency of the combination of the wheel and abrasive as the cutting tool depends almost entirely upon the strength of the glue bond. The ability to secure the desired finished surface, and the cost of securing that surface, depend upon the strength of the glue bond. In fact, glue is the keystone of successful polishing.

The glue which gives the most satisfactory results for polishing is the best quality, first-run, straight hide glue. The characteristics necessary are jelly strength, toughness, viscosity and—what is more important than anything else—flexibility. Many glues set hard and brittle, and are broken up and torn out by the bending action of the face of the wheel.

Two elements in glue handling must be recognized and controlled. One is heat, the other is bacteria.

Heat makes glue, and heat destroys glue. The maximum strength of the glue bond, which enables it to resist the frictional heat generated in polishing, is secured only by a proper control of heat in the preparation of the glue.

Glue loses 5 per cent of its strength for every hour of heating. Laboratory tests have shown a loss of 67 per cent of strength after 12 hr. under heat. Tests of a high-grade glue, made by the United States Forestry Bureau, showed a loss of one-half the glue strength in 7 hr. at a temperature of 176 deg. Fahr. Glue is in its strongest condition at a temperature of 135 deg. Fahr.

In applying glue to the wheel, no draft of air should come in contact with the glue brush, for instant chilling and serious weakening of the glue will result. The wheels and abrasives, heated to at least 120 deg. Fahr., will allow the whole mass of abrasives, glue and the wheel to cool gradually, without detriment to the glue strength.

Glue hardens in the process of setting much as concrete does. Setting begins with the cooling, but continues long after the cooling has reached its stopping point. A wheel head may be cold in an hour or so, appearing to be ready to use. As a matter of fact, a minimum of 48 hr. is required to complete the natural process of setting glue to its maximum strength. The process of setting is, of course, the evaporation of moisture.

A fact not apparently well known is that glue handling is a fight with bacteria, and again the question of heat comes in. Glue chemists tell us that the bacteria increase rapidly, consuming the strength of the glue, at temperatures higher than 140 deg. fahr. This is recognized in the manufacture of glue, which is cooked at temperatures of about 140 deg., and then the temperature is reduced as quickly as possible in the process of solidifying the glue, to the point at which the bacteria become virtually inactive.

As to the supervision and standardization of the polishing department, the author's observation of the industry, both in this country and abroad, has convinced him that it is to the advantage of executives and engineers that they analyze their polishing problems; that they do not try to correct conditions by remedying the weak spots, but by making a complete and fundamental analysis as a basis for a systematic control and standardization of polishing departments.

Corrosion Resistant Alloys to Be Featured at Chemical Show

An unusually complete assemblage of steels and alloys to resist corrosion and other forms of chemical attack will be on view at the Eleventh Exposition of Chemical Industries, Grand Central Palace, New York, Sept. 26 to Oct. 1, and much equipment using these materials in essential parts will be on display. The general subject of metallic materials of construction will be discussed on Sept. 30, at 10 a. m., by competent speakers for the benefit of the students attending. Hugh D. McLeese, of the Chromium Corporation of America, will discuss "Chromium Plating in the Paper Industry" before the Technical Association of the Pulp and Paper Industry, meeting at the exposition on Sept. 28, at 2 p. m.

James B. Wilbur, Jr., New Britain, Conn., has been appointed temporary receiver of the Stanford Steel Corporation, Milford, Conn., manufacturer of hot-rolled strip steel.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Sept. 6	Sept. 3	Sept. 2	Sept. 1	Aug. 31
Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25
Electrolytic copper, N. Y.*	13.00	12.95	12.90	12.90	13.00
Straits tin, spot, N. Y.	63.75	....	63.50	63.50	63.50
Lead, New York	6.40	6.50	6.50	6.50	6.50
Lead, St. Louis	6.05	6.15	6.15	6.15	6.15
Zinc, New York	6.62½	6.60	6.57½	6.60	6.62½
Zinc, St. Louis	6.27½	6.25	6.22½	6.25	6.27½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Sept. 6.—Inactivity incidental to the Labor Day holiday has further intensified the sluggishness which has prevailed in most of the markets recently. Practically no business was done on Saturday, Sept. 3, and today the markets are only just getting started again. Prices of tin and zinc are practically unchanged from the week previous, while copper and lead are slightly weaker.

Copper.—Buying of electrolytic copper has been confined within very narrow limits, with most producers adhering each day to the quotation which prevailed a week ago—13.25c., delivered in the Connecticut Valley. From one or two sources a little metal has been available at slightly lower levels, some small transactions taking place between 13.12½c. and 13.20c., delivered. Today business has hardly started and the quotation is largely nominal at 13.25c., delivered. Copper Exporters, Inc., still maintain an official quotation of 13.50c., c.i.f. Hamburg. Demand from foreign countries has also been on a smaller scale. Lake copper is quoted at 13.25c. to 13.37½c., delivered.

Copper Averages.—The average price of Lake copper for the month of August, based on daily quotations in THE IRON AGE, was 13.38c., delivered. The average price of electrolytic copper was 12.99½c., refinery, or 13.24½c., delivered.

Tin.—For the week ended Saturday, Sept. 3, about 1200 tons of tin changed hands, with activity confined to two days in particular—on Thursday, Sept. 1, close to 500 tons was sold, and on Tuesday, Aug. 30, about 300 tons. The week's business was confined mostly to dealers. Consumers are uninterested and are well supplied for their September-October needs. A feature of the market is the fact that the decrease in the world's visible supplies was considerably less than expected and was a disappointment to the New York and London markets. Instead of being about 1500 tons, the decrease was around 900. Arrivals during the month of August were 7112 tons, of which 7017 tons came in at Atlantic ports. Deliveries of the metal into consumption during August were 6895 tons, with 2201 tons in stock and landing on Aug. 31. The market today here has been quiet, with spot Straits tin quoted at 63.75c., New York. London prices today were slightly higher than a week ago, with spot standard quoted at £290, future standard at £284 10s. and spot Straits at £295 10s. per ton. The Singapore price today was £288 17s. 6d.

Lead.—Consumers are well supplied and the market continues quiet. Today the London market is off considerably from previous levels and lead from Mexican ore can now be imported and pay the duty. As a result of these conditions and supplementing the reduction of its contract-price late in the day on Aug. 30, the American Smelting & Refining Co. for the second time in the week, late this afternoon, Tuesday, lowered its quotation from 6.50c. to 6.40c., New York. The outside market is also lower, having been 6.15c., St. Louis, up to and including today. It is probable that by tomorrow the outside market will fall close to 6c., St. Louis.

Zinc.—On Friday, Sept. 2, the market was fairly active, with a moderate amount of business reported, accompanied by slightly lower prices. The new week opens with the tone rather firm and with producers

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	65.25c. to 66.25c.
Tin, bar	67.25c. to 68.25c.
Copper, Lake	14.62½c.
Copper, electrolytic	14.37½c.
Copper, casting	13.87½c.
Zinc, slab	7.75c. to 8.75c.
Lead, American pig	7.75c. to 8.75c.
Lead, bar	10.00c. to 11.00c.
Antimony, Asiatic	13.00c. to 14.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	41.50c. to 42.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	67.50c.
Tin, bar	69.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc slab	7.75c.
Lead, American pig	7.50c.
Antimony, Asiatic	18.00c.
Lead, bar	9.50c.
Babbitt metal, medium grade	21.75c.
Babbitt metal, high grade	73.25c.
Solder, ½ and ½	39.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c. to 25.25c.
Seamless Tubes—	
Brass	23.12½c. to 24.12½c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes	26.25c. to 27.25c.
Brass Rods	16.00c. to 17.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

There has been no change in the mill prices on bronze, brass and copper products since Aug. 3. Quotations on zinc sheets and lead full sheets have been the same since Aug. 5 and July 30 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.25c.
Copper, hot rolled	22.00c.
Zinc	10.00c.
Lead (full sheets)	10.25c. to 10.50c.
Seamless Tubes—	
High brass	23.12½c.
Copper	24.00c.
Rods—	
High brass	16.00c.
Naval brass	18.75c.
Wire—	
Copper	15.25c.
High brass	18.75c.
Copper in Rol's	21.00c.
Brazed Brass Tubing	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	19.25c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	11.00c.
Lead, wide	10.25c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	28.50c.
Brass Rods	16.00c.

holding prices close to 6.30c., St. Louis, but with some metal available at 6.27½c.

Antimony.—Conditions remain unchanged, with demand very light for Chinese metal, which today is quoted at 11.75c., New York, duty paid, for all positions.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c. and electrolytic nickel at 39c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c., New York, duty paid.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 6.—Sales are in moderate volume except in zinc, which has been fairly active this week. The price has advanced. Sales of old metals are small and the market is without feature.

Prices, per lb., in carload lots: Lake copper, 13.35c.; tin, 65c.; lead, 6.30c.; zinc, 6.35c.; in less-than-carload lots, antimony, 13.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.50c.	5.00c.
Zinc	4.00c.	4.50c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

FABRICATED STRUCTURAL STEEL

Awards of 32,700 Tons Include 10,000 Tons for Two Bridges

A bridge across the Mississippi River near St. Louis, requiring 6000 tons, and another over the Ohio at Paducah, Ky., taking 4000 tons, were the outstanding projects in the 32,700 tons of fabricated steel reported let during the last week. Included in the 10,500 tons of new work was a Y. M. C. A. building at Philadelphia which will require 3500 tons. Awards follow:

DELAIR, N. J., 325 tons, building for Kaeckhefer Container Co., to Bethlehem Fabricators, Inc.

TOLEDO, OHIO, 1800 tons, building for Libbey-Owens Sheet Glass Co., to Rochester Bridge Co.

MONROE, MICH., 300 tons, greenhouse for Greening Nursery, to Bellefontaine Bridge & Steel Co.

BIRMINGHAM, 1550 tons, 12 barges for Tennessee Coal, Iron & Railroad Co., to American Bridge Co.

GREAT NORTHERN RAILROAD, 2300 tons, bridges, to American Bridge Co.

CHICAGO, MILWAUKEE AND ST. PAUL, 800 tons, bridges, to American Bridge Co.

NEWTON, MASS., 700 tons, school, to New England Structural Co.

NORWOOD, MASS., 150 tons, memorial municipal building and bell tower, to Eastern Bridge & Structural Co.

LOWELL, MASS., 200 tons, Boston & Maine Railroad bridge, to Phoenix Bridge Co.

WILLIAMSTOWN, MASS., 100 tons, Williams College dormitory, to New England Structural Co.

STAMFORD, CONN., 300 tons, high school, to Lehigh Structural Steel Co.

NEW HAVEN, CONN., 900 tons, Brady Memorial Hospital, to Lehigh Structural Steel Co.

NEW HAVEN, 150 tons, Yale field stands, to Lehigh Structural Steel Co.

HARTFORD, CONN., 120 tons, White Motor Co., garage, to Lehigh Structural Steel Co.

NEW BRITAIN, CONN., 350 tons, Leonard Building, to Lehigh Structural Steel Co.

BOSTON & MAINE RAILROAD, 200 tons, bridges, to Phoenix Bridge Co.

BROOKLYN, 600 tons, public library, to an unnamed local fabricator.

ELIZABETH, N. J., 400 tons, Y. M. C. A., to Alfred E. Smith Co.

EAST ORANGE, N. J., 200 tons, apartment building, to American Bridge Co.

ERIE RAILROAD, 175 tons, bridge, to American Bridge Co.

SYRACUSE, N. Y., 1400 tons, hospital, to an unnamed fabricator.

PHILADELPHIA, 350 tons, Pennsylvania railroad subway, to American Bridge Co.

BALTIMORE, 225 tons, building for *Baltimore Sun*, to Maryland Steel Products Co.

BALTIMORE & OHIO RAILROAD, 1125 tons, bridges; 1000 tons to McClintic-Marshall Co. and 125 tons to American Bridge Co.

WINSTON-SALEM, N. C., 1000 tons, building for Reynolds Tobacco Co., to Bethlehem Steel Co.

ST. PAUL, MINN., 400 tons, building for the Russell Grader Mfg. Co., to McClintic-Marshall Co.

CHICAGO, 400 tons, subway on Oakwood Boulevard, to McClintic-Marshall Co.

CHICAGO, 1400 tons, garage for Nash Sales Co., to American Bridge Co.

PADUCAH, KY., 4000 tons, bridge across the Ohio River, to Wisconsin Bridge & Iron Co., Milwaukee.

INDIANAPOLIS, 300 tons, field house for Butler College, to Central States Bridge Co., local.

MILWAUKEE, 1100 tons, new Cedar-Biddle bascule bridge, to Milwaukee Bridge Co.

MILWAUKEE, 900 tons, 14 bridges for Milwaukee Electric Railway & Light Co., to Lakeside Bridge & Steel Co.

MILWAUKEE, 200 tons, railroad span on East Locust Street bridge, to Lakeside Bridge & Steel Co.

GREEN BAY, WIS., 100 tons, shop extension for Northwest Engineering Works, to Wisconsin Bridge & Iron Co.

ST. LOUIS, 200 tons, blacksmith and machine shops for Missouri Pacific Railroad, to Stupp Brothers Bridge & Iron Co.

ST. LOUIS, 6000 tons, bridge across the Mississippi River at Chain of Rocks, to American Bridge Co.

OAKLAND, CAL., 600 tons, Woman's Club building, to California Steel Co., San Francisco.

SAN FRANCISCO, 800 tons, Y. M. C. A. building, to Judson Mfg. Co., local.

LOS ANGELES, 300 tons, mechanical building for Goodrich Tire & Rubber Co., to McClintic-Marshall Co.

YAKIMA, WASH., 260 tons, two 200-ft. riveted spans, to Hofius Steel & Equipment Co., Seattle.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 3300 to 3500 tons, Navy Central Y. M. C. A. building, previously reported as 1500 tons.

BOSTON, 265 tons, sales and service building for Argonant Realty Co. in Brighton district.

FRAMINGHAM, MASS., 100 tons, office building, West Boston Gas Co.

CAMBRIDGE, MASS., 100 tons, garage, Klauer Brothers.

PROVIDENCE, R. I., 600 tons, Union Trust Co. building.

NEW YORK, 1500 tons, Pan-Hellenic Club, First Avenue and Forty-ninth Street.

BRIDGETON, N. J., 200 tons, Stanley Theater.

EAST ORANGE, N. J., 1500 tons, apartment building on South Munn Avenue.

ERIE RAILROAD, 150 tons, bridge in New Jersey.

BALTIMORE, 500 tons, building for American Smelting & Refining Co.

YOUNGSTOWN, 600 tons, boiler house to be built by Dwight P. Robinson & Co., Inc.
PARK RIDGE, ILL., 250 tons, theater.
MILWAUKEE, 2000 tons, first unit of civil courts building.
VIROQUA, WIS., 375 tons, Bad Axe bridge, town of Genoa, Vernon County; bids close Sept. 15.
SAN FRANCISCO, 160 tons, shed for the Southern Pacific Co., at Fourth and Channel Streets; bids in.
SAN FRANCISCO, 220 tons, San Francisco municipal airport; bids Sept. 7.

RAILROAD EQUIPMENT

South African Railways Inquire for 125 Locomotives

An inquiry by the South African Railways for 125 steam locomotives is the only important item in the equipment field which has come out recently. New buying has been confined to small lists.

Freight cars in need of repair on Aug. 15 totaled 148,346 or 6.5 per cent of the number on line, according to reports filed with the car service division, of the American Railway Association. This was an increase of 2756 cars above the number reported on Aug. 1, at which time there were 145,590 or 6.3 per cent. It was, however, a decrease of 21,419 cars compared with the same date last year. On Aug. 15 there were 9074 locomotives in need of repair, an increase of 539 compared with Aug. 1.

Details of the week's business follow:

The South African Railways are inquiring for 125 steam locomotives and one electric freight locomotive.

The Western Maryland will make repairs to 1000 freight cars in its own shops.

The Consolidated Railways of Cuba will buy three sleeping cars.

The Chicago Great Western has purchased two mail and baggage cars from the Pullman Car & Mfg. Corporation.

The Lehigh Valley has ordered six dining cars from the Pullman Car & Mfg. Corporation.

The Chicago & Northwestern is in the market for nine gas-electric cars.

REINFORCING STEEL

New Projects Will Take Nearly 3000 Tons—Awards of 2265 Tons

Included in the 2970 tons of reinforcing bars which will be required in new work out in the last week is 790 tons for a Chicago office building. Lettings of 2265 tons include no sizable jobs. Awards follow:

LOCKPORT, ILL., 250 tons, Sanitary District project, to Barton Spiderweb System.
CHICAGO, 100 tons, improvements at Sleepy Hollow Cemetery, to Concrete Engineering Co.
CHICAGO, 125 tons of rail steel, store building, to Olney J. Dean & Co.
NICKEL PLATE RAILROAD, 120 tons, culvert in Cleveland, to Bourne-Fuller Co.
OHIO STATE HIGHWAY COMMISSION, 370 tons, bridge over Maumee River, to Bourne-Fuller Co.
BOSTON, 400 tons, Hyde Park school, to Joseph T. Ryerson & Son, Inc., Boston.
BOSTON, 500 tons, Dorchester Bay bridge, to Aberthaw Co.
BOSTON, 200 tons, foundation Cadillac Motor Car Co. sales and service building, to Concrete Steel Co.
SEATTLE, 100 tons, apartment building, Sixteenth Street and Denny Way, to Northwest Steel Rolling Mills, Inc., Ballard, Wash.
SAN JOSE, CAL., 100 tons, monastery at Menlo Park, to Badt-Falk Co., San Francisco.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PHILADELPHIA, 190 tons, public school; bids in.
BUFFALO, 600 to 700 tons, foundations for new City Hall.
CHICAGO, 180 tons, De Paul University office building.
CHICAGO, tonnage being estimated, Bryn Mawr Beach Hotel.
CHICAGO, 790 tons, third to eighteenth floors, Chicago Evening Post Building.
HINE, MO., 450 tons, settling basin for St. Louis municipal waterworks; Frazier-Davis Construction Co., St. Louis, low bidder on general contract.
GRASS VALLEY, CAL., 361 tons, two dams for the Grass Valley Irrigation District; bids Sept. 22.
SACRAMENTO, CAL., 257 tons, paving work for State Highway Commission at San Luis Obispo; bids Sept. 26.
SACRAMENTO, 140 tons, bridge for State Highway Commission in Chileno Valley, Marin County; bids Sept. 7.

FOCUSING UPON SAFETY

Keeping Memory of Accidents Fresh in Mind Helps Avoid Them

PUBLICITY methods devised by C. R. Little, safety director Newport Rolling Mill Co., Newport, Ky., are reported to be bearing fruit. The methods are based upon the psychological element of calling attention to the name of the individual injured, and keeping that name before his fellow workmen until some one else achieves the unenviable distinction of taking his place.

At the main entrance to the mill is placed a large bulletin board, named the "Daily Devil." On this board are placed notices in connection with the mill, clippings from magazines, pictures, posters and cartoons. Anything which will attract attention and keep the minds of the men on the problem of conserving safety may find its place here.

In front of the board, as shown in the illustration, is a tombstone painted white and surmounted by a white cross. Upon it is shown the name and department of the man most recently injured, together with the date. This name is kept there until someone else is injured, when his name replaces the first. These injuries do not include the minor cases, but do include everything which represents lost time.

At the place where the accident was incurred another white cross is erected, which remains there until

Tombstone and Posters to Work on the Men's Psychology and Prevent Accidents

the accident has been investigated by the safety court and responsibility fixed. This safety court has a judge appointed by the superintendent. The safety director acts as prosecutor, while the man's foreman acts as his attorney, if the man is charged with violation of a safety rule. Conviction of such violation involves a penalty of from 1 to 100 days' suspended sentence. When accumulated penalties amount to 100 days in one year the man is automatically discharged. Each court case is posted on the bulletin board.

No one likes to see his own name on a tombstone. The first man who had his name put up said it had been in many places before, but never in such a place. He does not want it there again. The white cross in the plant placed at the point of injury has a steadying effect upon every man who sees it and reflects what it means. The combination of publicity, possible penalty and seriousness of each case is making the men think.

Copper production in Chile continues at a high rate, according to Attaché Ralph H. Ackerman. Exports of ingots in six months were 116,630 tons, a gain of 35,322 tons over 1926.

PERSONAL

Robert E. Kinkead has resigned as chief engineer, welder division, Lincoln Electric Co., Cleveland, to engage in consulting engineering in connection with electric arc welding, with office at 3030 Euclid Avenue, Cleveland. After his graduation in electrical engineering from Ohio State University in 1913, he immediately joined the Lincoln Electric Co. A year later he had applied the inductive ballast principle or "stabilizer" to arc welders and had become engineer of the welding department. In this capacity he served until 1917, when commissioned in the United States Navy. After the war he became chief engineer for the Mitchell Co., Chicago, emergency master mechanic and welding contractor. After a short period as welding expert for the Western Electric Co. at the Hawthorne plant in Chicago, he returned to the Lincoln company as chief engineer, welder division. He is a member of the Cleveland Engineering Society and the American Welding Society.

ROBERT E. KINKEAD

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Paul Hecht, South Philadelphia works, Westinghouse Electric & Mfg. Co., has been appointed assistant to the vice-president. He has been with the Westinghouse company since 1905, and since 1916 has been in the department of price and estimating. He had charge of erecting the new turbine blade shop and the transferring of the blading activities from East Pittsburgh to South Philadelphia.

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R. J. Kaylor, manager of publicity, Youngstown Sheet & Tube Co., who has been away from his office for several months on account of illness, is reported to be improving at his old home near Ebensburg, Pa., and expects to return to Youngstown at an early date.

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H. V. Greenwood, formerly sales manager Baldwin Chain Co., recently joined the sales organization of Foote Brothers, Gear & Machine Co., Chicago, as Michigan district representative. He will make his headquarters in Chicago, but will cover the State of Michigan with the exception of the Detroit and Grand Rapids territory.

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Frank C. Davies has been placed in charge of blast furnaces for the Donner Steel Co., Inc., Buffalo, succeeding John Whiting, who has become associated with the Hamilton Coke & Iron Co., Hamilton, Ohio. Mr. Davies was at the South works, Illinois Steel Co., from 1908 until 1912 and spent the next three years at the Edgar Thompson furnaces of the Carnegie Steel Co. Prior to 1920, when he became assistant superintendent of the Donner furnaces, he was engaged at the coke plant of the Youngstown Sheet & Tube Co. Mr. Whiting came to the Donner company in 1922 from the Mayville, Wis., furnaces of the Youngstown Sheet & Tube Co. Previously he was successively at the South works, Illinois Steel Co.; with the Federal Furnace Co., South Chicago, and with the Whitaker-Glessner Co., Portsmouth, Ohio. C. E. Clarke, who has been appointed assistant to the blast furnace superintendent at the Donner plant, has been general foreman of the furnace department since 1923. He gained his early experience in the Central furnaces of the American Steel & Wire Co. in 1914 and 1915. Later he was employed in the Canton, Ohio, and the Middlesex, Pa., furnaces of Pickands, Mather & Co., Cleveland.

E. T. Whitney has been appointed sales manager of the Cohoes Rolling Mill Co., Cohoes, N. Y., manufacturer of wrought iron pipe. He received his engineering training at the Rensselaer Polytechnic Institute, Troy, N. Y., and for the last three years has been in charge of the company's Philadelphia territory.

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Arthur Tregoning Cape, metallurgist, Central Alloy Steel Corporation, Massillon, Ohio; R. W. Cook, general manager, Wallace Barnes Co., Bristol, Conn.; Thomas Evan Eagan, assistant superintendent of research, Midvale Co., Nicetown, Pa.; David B. Reeder, metallurgical chemist, Keystone Driller Co., Beaver Falls, Pa.; William White, Standard Steel Car Co., Butler, Pa.; and John F. Wyzalek, chief metallurgist, Hyatt Bearings division, General Motors Corporation, Arlington, N. J., are among those proposed for membership in the Iron and Steel Institute and to be voted on at the Glasgow meeting this month.

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Ernest Kugel, chief engineer of the Kalker Maschinenfabrik, A. G., Köln-Kalk, Germany, has arrived in the United States to learn of American methods in operating rolling mills.

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J. E. Randall has been added to the sales organization of the Young Brothers Co., Detroit. Prior to 1925 he served the company as New York representative and he has specialized in oven work and industrial baking problems for the last 10 years.

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D. H. Fair, recently in the main office of the George Haiss Mfg. Co., Inc., New York, has been appointed district representative for the company in the Great Lakes States with headquarters at Chicago.

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J. J. Hilt, who has been associated with the Racine Radiator Co. and its predecessor, the Prefex Radiator Co., Racine, Wis., since 1919, has been appointed sales manager of the recently organized Young Radiator Co., Racine.

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Edward B. Bishop, who has been associated with the Globe Malleable Iron & Steel Co., Syracuse, N. Y., for the last 17 years, most recently as superintendent of the drop forge department, has been made general manager of the company, the name of which has lately been changed to the Globe Forge & Foundries, Inc. With the change in name the forge department has been developed to include approximately 85 per cent of the company's output. The executive personnel of the company is as follows: A. T. Brown, president; William S. Farmer, vice-president; W. Charles Lipe, treasurer, and D. E. Hethington, assistant treasurer and secretary.

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Charles S. Baur, general advertising manager of THE IRON AGE, on the beginning of his twenty-sixth year with this journal on Sept. 1, was given a testimonial dinner by his associates, who presented to him a silver tea set with the inscription, "In commemoration of twenty-five years of distinguished service and in recognition of his rare devotion and accomplishment."

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David Thomson, general superintendent Columbia Steel Co., Butler, Pa., under its former management, has been appointed works manager by the American Rolling Mill Co., which acquired the Columbia company about six weeks ago.

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Charles F. Logan has resigned as special representative of the Poldi Steel Corporation of America to become sales manager of the recently organized roll department, Union Electric Steel Corporation, Carnegie, Pa.

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The American Society of Mechanical Engineers announces the award of traveling fellowships to Herbert N. Eaton, of the Bureau of Standards at Washington, and Blake R. Vanleer, professor of mechanical engineering in the University of California, Berkeley, Cal.

New Haven Exhibit to be Occasion of New England Industries Dinner

A New England Industries dinner, arranged for Thursday evening, Sept. 8, will be a feature event in connection with the seventh annual New Haven Machine Tool Exhibition, which opened at the Mason Laboratory, Yale University, New Haven, Conn., Sept. 6, and will continue through Sept. 9.

The dinner will be held at the Hotel Taft, New Haven, under the auspices of the New England Council, the Manufacturers' Association of Connecticut, the New Haven Chamber of Commerce and other organizations. The keynote of the dinner, according to the announcement, will be the vital need for early and sweeping reequipment programs in the older manufacturing plants of New England, and other sections of the East, as the insurance of their continued prosperity.

Speakers will include the Hon. John H. Trumbull, Governor of Connecticut, whose address will be on "New England, the Birthplace of American Industry," Other speakers and the subjects upon which they will talk are as follows: Charles R. Gow, president of the Gow Co., "Survey of Industrial Conditions"; C. R. Burt, vice-president and general manager Pratt & Whitney Co., Hartford, "Installation of New Machinery and Methods in the Plant of the Pratt & Whitney Co."; Charles L. Newcomb, manager of the Deane Works, Worthington Pump & Machinery Corporation, "What Is Industrial New England Thinking About?"; L. W. Wallace, executive secretary American Engineering Council, "Future Problems of Industry."

Technical sessions held during the exposition of machine tools are under the auspices of the machine shop practice division of the A. S. M. E. Two papers dealing with the problem of machine tool replacement were presented during the morning of Sept. 7, and there was a round-table discussion on production, machine tool engineering and shop practice in general at an evening meeting. The program for the morning of Sept. 8 includes a paper on "Modern Finishes for Machine Tool Industry," by W. R. Atwood, and another on "Prerequisites of Successful Polishing," by B. H. Divine. A session devoted to foremanship training, at which there will be two speakers, has also been arranged.

Papers for the Friday morning, Sept. 9, session include "Improvements in Copper Wire Mill Equipment," by Samuel McMullan, and "Manufacture and Application of Extruded Tubes," by G. A. Foisy. There will also be an anti-friction bearing session at which R. F. Runge will present a paper on "Recent Developments in the Application of Anti-Friction Bearings to Machine Tools." Another paper, by Frank Brauer, will be devoted to "Anti-Friction Bearings in Ordnance Work." It should be mentioned that these technical sessions comprise the first national meeting of the machine shop practice division of the A. S. M. E. A report of the technical sessions as well as of the machine tool exposition will be included in a forthcoming issue of THE IRON AGE.

Automobile Prospects Considered Good by Makers

Automotive Industries this week will say: "Somewhat lower production schedules have been put into effect by several automobile factories, but a majority are still on a strong basis for the season. The impending new Ford model continues to act as a restraining influence on sales, despite the growing impression that volume output of the car remains some time off.

"The outlook for fall business is considered particularly good, because of favorable reports from most of the agricultural districts. The advance in cotton is a particularly good sign, as the best market for motor cars and trucks in the cotton-growing regions normally is in the late months of the year.

"Although the volume of business so far in 1927 has been satisfactory for manufacturers and dealers, profit margins have suffered in many instances. The recent price cuts have not helped matters at the factories, despite lower material costs in some instances."

OBITUARY

HARRY C. SMITH, general manager of sales strip steel department, Weirton Steel Co., Weirton, W. Va., died at his home in Steubenville, Ohio, Sept. 5, following an illness of several months. He had been associated with this company for almost 11 years and previously for 18 years had been with the Carnegie Steel Co., Pittsburgh. He was born in Pittsburgh May 22, 1884, and while still a boy, entered the employ of the Carnegie company in its sales department. He later became a salesman and in 1917, joined the Weirton company as assistant general manager of sales. In that capacity he supervised strip steel sales and was made head of the strip steel sales division when the growth of the company made necessary a segregation of its sales activities.

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ALBERT W. DOW, secretary Spring Perch Co., Stratford, Conn., automobile spring manufacturer, died at his home in Bridgeport, Conn., on Aug. 28, aged 62 years.

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H. HOWARD HELLER, works manager of the Ford Instrument Co., Long Island City, N. Y., died at his summer home at Sound Beach, Conn., on Aug. 28. He was graduated from Cornell University in 1903 as a mechanical engineer, and joined the Ford organization in 1917. He was a member of the American Society of Mechanical Engineers.

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STUART D. LANSING, since 1915 president of the Bagley & Sewall Co., Watertown, N. Y., manufacturer of paper mill machinery, died at his home in that city on Sept. 3. He was born at Watertown in 1866 and entered the employ of the Bagley & Sewall organization immediately after graduating from the University of Pennsylvania in 1888.

Foreign Trade of Southwest Africa Increasing Rapidly

Under the influence of expanding mineral and agricultural development, the foreign trade of Southwest Africa has shown a consistently upward tendency over the past four years. The returns for 1926, just available, disclose imports valued at £2,507,625, and exports amounting to £3,292,986.

Although both phases of the trade have been characterized by a distinct improvement, imports have registered the most notable gains, advancing by nearly 93 per cent over the four-year period, from £1,301,304 in 1923 to £1,777,164 in 1924, to £1,898,510 in 1925 and to £2,507,625 in 1926. The heaviest single increase in 1926 was in the group covering metals, machinery and vehicles, which advanced from £637,566 to £771,171 and is directly attributable to the upward trend in agriculture and mining in the Protectorate.

Imports from the United States into Southwest Africa, while relatively small, have shown a marked increase during the past four years, rising from a value of £16,914 in 1923 to £93,678 in 1926. Indirect imports by way of the Union of South Africa are known to be considerable, especially in such lines as agricultural implements, mining machinery, motor cars, etc., and undoubtedly account for a fair share of the £688,882 worth of goods imported through the Union during 1926.

Freight rates per ton-mile in the United States are reported by *Railway Age* to have advanced only 14 per cent in the 37 years since 1890. In contrast, general commodity prices are credited with an advance of 79 per cent and of farm products, at wholesale, 96 per cent. Though the freight business handled has increased 500 per cent, there are only 125 per cent more locomotives and 165 per cent more freight cars than 37 years ago.

Situation in Lorraine Iron Ore*

Economic Side and Industrial Position—Technical Conditions of Production—Political Elements Affecting Use of Ore

LORRAINE iron ore is characterized chiefly by poverty in iron and richness in gangue. Its associated earthy materials contain considerable phosphorus. Using it direct from the mine, the early technician was able to obtain from it a product which dominated the markets of the world. This was during the period when the Catalan oven, heated with charcoal, had been replaced by the modern blast furnace, using coke. The gangue composition permitted ready fusing of the ore.

Ores from other localities, such as Briey, Meurthe and Moselle, were found to lack either the necessary lime or the silica required to form a fusible mixture. The Lorraine ore, however, contained both these elements and thus had a flux which in most cases was sufficient in itself. Only one substance, manganese, is lacking in the Lorraine ore for best results. Hence, about 2 per cent of manganese ore from Russia is added.

Shipments of Lorraine ore to the interior of France amounted in 1913 to 516,952 metric tons. Since the war, these shipments have been much less. In 1920 they were only 104,579 tons, increasing in 1922 to 168,345 tons.

Steel Slow in Displacing Puddled Iron

After the annexation of Lorraine by Germany in 1871, when iron was being replaced by steel, the manufacture of iron continued in Lorraine, as the puddle furnace there used eliminated practically all of the carbon, retaining an insufficient quantity to make steel. The region did not take kindly to the Bessemer process invented in 1855, because that process did not permit elimination of phosphorus, and the Lorraine ores contain considerable phosphorus.

Only when the basic converter was perfected, with a facing made of pure magnesite, replacing the silica brick of the Bessemer converter, did the region advance in the making of steel. This invention of the Thomas process, made in England and transported for use to the Continent, gave rise to the theory, "The Migration of an Idea," as follows:

> 1. A great idea is born in a country where a highly developed science has found numerous and various applications.
>
> 2. This country, scientifically, technically and economically saturated, is opposed to the realization of that idea.
>
> 3. Threatened with being smothered, the idea migrates to a less advanced country, where it finds a new ground for integral application.

In 1896 the first Thomas steel plant was started in the Lorraine district. From this year dates the great modern industry, utilizing an ore previously declared unfit for the manufacture of steel. With the new process, the Lorraine steel makers obtained a soft metal, homogeneous and thoroughly suitable for making heavy metallurgical products, such as beams, plates and sheets. The phosphorus, eliminated and mostly going into the slag, became a highly valuable by-product for fertilizers. Sale of the slag reduced the net cost of making steel and greatly compensated for the extra expense of the basic materials required.

Low Iron Content and Some Remedies

Lorraine ore averages only 32 per cent Fe, compared with 36 per cent in the Nancy ore, 38 per cent in Briey ore, and 50 per cent in ore from Normandy. Even the 32 per cent is not all recovered, because of losses in the form of dust during mining, loading and unloading, and dropping of ore into the furnace. As a result, only 28 per cent is finally utilized. Because of this small iron recovery, Lorraine ore was long largely disregarded.

During German occupation, covering 47 years, high expense was faced by the Germans in importing Spanish, Swedish, and even Briey and Normandy ores. Increasing the iron content by roasting or washing, however, proved to be the solution. The roasting was adopted because the washing would have robbed the ore of much of its associated fluxing materials.

Through the roasting process, moisture running as high as 10 per cent is removed and volatile material extracted, reaching sometimes 20 per cent. Thus the iron content of Briey ore, running perhaps 39 per cent from the mine, was increased to 46 per cent.

Great saving in coke was brought about by this prior treatment of the ore. Relieved of moisture and ground fine, the saving was about 100 kg. of coke per ton of melt. In passing, it is noted that American blast furnaces consuming treated ore use 800 kg. of coke per ton of melt, against 1300 kg. in Lorraine. Of course, the roasting process uses a great deal of heat, but the saving at a later stage more than compensates for this cost.

Utilization of Coal

Similar good results have not been obtained in handling the fuel as have followed the beneficiation of the ore. This problem has not yet found an entirely satisfactory solution.

Because charcoal was in early days the only combustible used, the primitive iron industry was established usually in places rich in ore and wood. Thus the early forges were located in dense woods far from centers of population. Heavy demand for charcoal caused the forests to disappear, largely. Only when the coking of coal became an established factor did the industry take on anything of its present aspect.

In normal times Lorraine consumes about 4,500,000 tons of coke a year. This was about the figure of 1913. There has been great reduction since then, however, for in 1920, 1921, and 1922 the consumption averaged only 1,839,000 tons a year. The coal production of the region includes 4,000,000 tons in the Moselle basin and 12,000,000 tons in the Saar. Unfortunately, however, this coal is not well adapted to the making of coke.

Germans Far Ahead in Coking

Germany had advanced far in the production of coke, with 30,000 ovens in 1913, against only 2000 in France, and 25,000 of the 30,000 were by-product ovens. The French number has now reached 5000, but it is still far below that of Germany. Production of coke in the Ruhr reached approximately 24,500,000 tons in 1913 and 25,052,000 tons in 1922.

The coal production of the Saar-Lorraine region in 1913 was only 9.3 per cent of the coal production of all Germany, while in coke that region produced only 5.5 per cent of the German coke total. Compared with the French production, however, that of Saar-Lorraine in 1913 was 44.6 per cent in coal and 44 per cent in coke. Thus the addition of the Saar and Lorraine fields to France has added about 44 per cent to the French capacity for producing coal and coke.

Lorraine Makes Only a Fraction of Its Coke

Two iron properties in Lorraine have coking plants close by. The de Wendel company has two batteries

*Translated from the French by O. E. Kiessling, and R. M. Santymeyer, Bureau of Mines, Washington. This is an abstract of the translation. The original paper was by Henry Laufenburger.

of coke ovens of 45 and 60 ovens respectively, producing about 400 tons of coke a day and many valuable by-products. These ovens, however, do not furnish all of the coke required by the furnaces. Some 150,000 to 200,000 tons a year must be purchased. In fact, the entire coke production of de Wendel is only one-tenth of the needs of all its blast furnaces, and 80 per cent of these needs must be supplied by foreign coke, although these plants are situated most favorably of any in the basin.

Coke for the Rédange-Dilling Co. is obtained in large part from a subsidiary company. All other iron makers in the district depend almost entirely on foreign coke. The coke ovens in the Saar and Moselle basins supply altogether only 5 per cent of the metallurgical coke consumed in Lorraine.

Political and Economic Obstructions

Before the great war, two groups in Germany opposed developing the Saar coal industry. Metallurgists in the Rhenish-Westphalian basin followed a personal and interested policy. The political power of the German State followed a nationalistic policy. Owners of the Ruhr plants, situated in the richest basin of Europe, and wishing to have a monopoly of iron in Germany, were fighting competition from the other side of the frontier. Unable to influence the supply of iron ore in Lorraine they tried to hinder the coke supply. They even dissuaded the Prussian Government from constructing a canal which would have reduced greatly the transportation charges on coke to Lorraine.

Considering it a national duty to prevent the concentration of a powerful iron industry on the frontier, the Prussian State, which held a great part of the Saar coal, opposed its development for the aid of the Lorraine iron industry. Coke made from this coal was defective in many ways. This defectiveness has been attributed in a certain measure to the methods of Government exploitation.

Technical Difficulties

Now that this political phase has disappeared, other difficulties in making coke from Saar coal have developed. Satisfactory coke must be rich in carbon and low in ash. Secondly, it must have enough strength to support the charge of ore in the blast furnace. Saar coke is poor enough, so that about 1600 kg. is required per ton of iron, against 1250 kg. of Westphalian coke. To use the porous and relatively small coke of the Saar district, it is considered necessary to diminish the charge of ore. To that effect, the height and size of the blast furnaces have been reduced. From this particular construction an appreciable quantity of the local coke has been made available, amounting to about 1,000,000 tons a year.

Another solution has been to mix with the Saar coal a certain amount of powdered hard coal, from which mixture a satisfactory metallurgical coke has been obtained. The possibility of getting, from Saar and Lorraine coals, a coke as good as that from the Ruhr has been demonstrated by laboratory experiments. This involves a mixing process. Two other processes, known as the cooking process and the distillation process, are regarded favorably, although they have not yet produced definite results.

Projected by-product coke ovens in the district will produce nearly 1,000,000 tons of coke a year. This is about one-fourth of the demand. While waiting for a definite solution of the problem of coking Saar coal, these ovens will use coal dust from northern France or from foreign countries. Thus, for several years, the Lorraine industry will have to depend upon a foreign source of supply for most of its coke.

Reducing the demand for coke for each ton of iron is a problem involving development of improved processes, including perhaps the use of electric heat.

In 1913 Lorraine produced 21,500,000 tons of iron ore and consumed 15,000,000 tons, or 70 per cent. Shipments to the Rhenish-Westphalian area were 3,000,000 tons, or 13½ per cent. Inversely, in 1913, the northwestern (German) area consumed 20,000,000 tons of its own coke production of 32,650,000 tons and shipped to Lorraine 3,506,000 tons of coke, or nearly 11 per cent. These two raw materials we have as the basis for an exchange.

When it is considered, however, that it is necessary in making iron to consume twice as much ore as coke, it is obvious that the relatively small purchases of ore made by the Ruhr in the Lorraine district are not in proportion to the ore consumption of the Westphalian industry. Proximity to the Rhine placed the Ruhr in a favorable position to receive Spanish and Swedish ores of high metal content. Transportation charges of ore low in iron are very high on the basis of iron content. This militated against Lorraine ores.

In addition to the Versailles treaty stipulations regarding yearly provisions of coal and coke for reparations, a considerable quantity of free coke has been imported by France from Germany. This averaged 1,000,000 tons a year from 1920 to 1922.

Pressure Applied to Obtain Results

Occupation of the Ruhr district by the French Government had reached its objective near the end of 1923, when the passive resistance of the German Government and coal owners, making the exploitation of the basin unproductive, was broken. The whole matter has been complicated by the introduction and abandonment, one after another, of various agencies engaged in handling coke across the border. It has all been tied up with reparations requirements, some of which have not been adequately fulfilled. The political and economic measures taken by the French Government were for the purpose of obtaining more prompt fulfillment of the obligations assumed by Germany.

Direct exchange of ore for coke has been suggested. The Versailles agreement of May 7, 1919, provided for an exchange of five tons of Lorraine ore for each four tons of indemnificatory coke. As a matter of fact, however, Lorraine depends much more upon Westphalia for coke than Westphalia depends upon Lorraine for iron ore. Lorraine can get its coke supply advantageously from Westphalia only. Westphalia, on the other hand, imports ore from Sweden, Spain, Canada, and even India with higher metal content than the Lorraine ore.

What Will Be the Outcome?

As a final solution, it has been suggested that the Lorraine industry be granted a degree of participation in the coal mines of the Ruhr. This plan would be to assign to the Lorraine metallurgical industry a quarter, or a fifth, of the product of certain Ruhr mines. This would allow them to receive some coking coal, or a proportionate amount of coke, in place of dividends equivalent to their participation.

How it will be possible to bring about this system of participation is the big question. The French plants concerned would like to impose it upon Germany and German industrialists as further reparations. It then would become a question of international rights and obligations. Its solution would become analogous to the program for reparations coke and similarly it could be made effective only through compulsion or extended control.

This plan cannot, probably, be realized. Participation would have durable value only when engaged in by both parties. This would predicate counter interest of Westphalian metallurgists in Lorraine ore. Only in this way would the personal interests of the two parties offer a certain guarantee for continuance of the plan.

No appreciable change in business conditions is anticipated for the remainder of 1927 by the National Association of Credit Men, according to the August monthly survey conducted by the association. The survey says that "conditions are sound and wholesome, with no sign of a business cycle depression which, according to some authorities, is long overdue, but which is not at all likely to materialize."

The United Steel Works, Düsseldorf, Germany, has established an extensive research institute at Dortmund which will be under the direction of Dr. Schultz and carry on work in alloy and construction steels.

SMALL VS. LARGE BUSINESS

Small Manufacturer Often as Efficient in Production but Is Weaker in Bargaining

LARGE scale production is not always more efficient than small scale production in the use of mechanical power and power-driven machinery, but it has a distinct advantage in bargaining, which can only be overcome through associated action on the part of the smaller units. This was the burden of an address on "The Place of the Small Manufacturer in Our Economic Systems" recently delivered before the National Electrical Manufacturers Association at New York by Prof. Thomas N. Carver, Harvard University, Cambridge, Mass. His remarks were in part as follows:

"Before jumping to the conclusion that large scale must necessarily be more efficient than small scale production, we shall do well to consider the significance of two senses in which that word efficiency is used. It sometimes means efficiency in the physical work of production, and it sometimes means mere efficiency in bargaining, that is, in buying and selling. Under efficiency in bargaining should be included efficiency in raising money through the sale of securities, in advertising and high pressure salesmanship, in buying raw materials, and especially in buying and controlling patents. The last named is an important advantage. By purchasing a large number of patents, affecting almost every phase of the production of a given commodity, and hiring able lawyers to prosecute every alleged infringement, a large concern may so terrorize an industrial field as to materially reduce the intensity of competition.

"There are undoubted mechanical and physical advantages which sometimes, but not always, go with large scale productions. Where such advantages can be shown to exist in the case of the large as compared with the small concern, the superiority of the large concern is established. Where they cannot be shown to exist, the case is 'not proved.'

"The optimum size for production is the size which will permit the full use of the best engines and machinery that have been invented, though the optimum size for bargaining may be much larger.

"As to the future of the small manufacturer, there is no future for him if he is too small to make use of the cheapest power and the most efficient machinery for his purpose. If he is large enough to make use of these, there is a possible future, though it is dependent upon his being able to solve his bargaining problems. Except for political interference, some plan similar to that of agricultural cooperation might be worked out, that is, a plan under which a number of producing concerns of the optimum size for production could combine into larger units for bargaining purposes. This seems to be the plan of the General Motors Corporation and several other large concerns, including all the chain stores. In the latter cases, the actual economic functions of merchandising are performed by relatively small units, which have proved their efficiency, whereas the financing and all the larger and more difficult forms of bargaining are performed by the huge organization. The principle is identical with that embodied in the farmers' cooperative associations. However, in the case of manufacturing the political and legal difficulties may be so great as to be prohibitive. At least it will require great legal ingenuity to avoid them."

CURB UNFAIR COMPETITION

Stop Uneconomic Selling Practices That Destroy Profits, Counsels Alexander

INCREASING intensity of competition has been making itself felt to such an extent in recent years that despite the heretofore unparalleled business activity many branches of industry are complaining of lack of profits, declared Magnus W. Alexander, president of the National Industrial Conference Board, in a recent address before the National Electrical Manufacturers' Association in New York. While the standards of business practice are being steadily elevated, business still is not free from obnoxious practices springing up under the growing pressure of modern competition, he stated, calling particular attention to the practice of selling at less than cost, to meet momentary emergency or to gain competitive advantage, as a demoralizing factor. Mr. Alexander said in part:

"The fact is that in recent years about two in every five manufacturing corporations have either made no profits or have incurred deficits. Analysis of income tax returns shows that in 1920, 37 per cent, in 1921, 54 per cent, in 1922, 41 per cent, in 1923, 37 per cent, in 1924 again 41 per cent, and in 1925, 39 per cent of the manufacturing corporations in the United States reported deficits or no net income. During these six years, for every $100 earned by the successful concerns, $32 was lost by the unsuccessful corporations. Studies of the National Industrial Conference Board further show that manufacturing corporations in 1925 operated on a distinctly narrower margin of profit than in 1923, the last previous 'good' year.

"Competition, we have been told over and over, is the life of trade. If the competition is sound, prosperity will be well grounded; if it is unsound, prosperity will be undermined.

"The character of business competition, however, will be determined by the character of the multitude of men engaged in business. We can have a continuance of sane prosperity, and a profitable prosperity, if every man will make the standard of his own conduct what he expects his competitor's conduct to be.

"The way to rid ourselves of such unfair means of competition as described is through such private control within trade channels, and not through the policing of industry by supervisory and regulatory governmental bodies, for where politics enters, economy and efficiency must necessarily draw away into the background. It is, moreover, my earnest belief that the way to stop illicit or uneconomic competition is not by curbing all business, but by curbing the competitor who does not play fair."

Fluorspar Briefs to Be Filed Oct. 1

WASHINGTON, Sept. 6.—Preparation of the report by the Tariff Commission on the application of domestic producers of fluorspar for an increase of 50 per cent in the duty cannot be completed until after briefs are filed both by those favorable and those opposed to the increase. Oct. 1 has been set as the time for filing the briefs. With the report the commission will make a recommendation to the President as to whether or not the duty should be increased.

Informal announcement has been made from the division of customs, Treasury Department, that it has not found any evidence to justify the issuance of antidumping notices concerning imports of fluorspar.

Pig Iron Price War in Germany Lowers Market

HAMBURG, GERMANY, Aug. 20.—The German Pig Iron Association is experiencing considerable trouble as a result of an outsider, the Maximilianshütte in Bavaria. This company, producing chiefly foundry iron, is offering severe competition to the association members and as a result both domestic and export prices have been sharply reduced. The association members are reported meeting any quotation made by the Maximilianshütte. Pressure has been brought on merchants to boycott this competitor but apparently without much success. It is said that other furnaces are contemplating withdrawal from the association.

The large iron mining company in Norway, the Sudvaranger Aktiebolag which has been in financial difficulties for the past year, has been purchased by some leading German steel companies. The new interests will continue operations and handle exports of ore, chiefly to Germany.

RECOMMENDS NEW PIPE RATES

Examiner Finds Cast Iron Pipe Rates Prejudicial to Eastern Producers

WASHINGTON, Sept. 6.—Scale rates for cast iron pipe from points of origin in the Philadelphia and nearby districts and from Chattanooga, Tenn., are suggested in a proposed report of Burton Fuller, examiner of the Interstate Commerce Commission, in passing upon a series of complaints after further hearing had been granted in the case of the Florence Pipe & Foundry Co., Florence, N. J., and other producers. The examiner prescribes three scales, largely similar. In each instance they start with a rate of 6c. per 100 lb. for 5 miles and under. One of them carries a rate of 78c. for 1500 miles and over 1475 miles, while another is 77c. and the third 77.5c., each with slightly varying rates for intermediate distances. Among the other complainants included, in addition to the Florence Pipe & Foundry Co., were the Somerville Iron Works, Somerville, N. J., and Chattanooga, Tenn.; the Warren Foundry & Pipe Co., Philippsburg, N. J., and the Krupp Foundry Co., Lansdale and Quakertown, Pa.

The examiner said the commission should find that the rates on cast iron pipe and fittings in carloads from Lansdale and Quakertown, Pa., to destinations in Maryland, Delaware, Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Georgia and Alabama are not unreasonable, but are unduly prejudicial to the complainant, the Krupp Foundry Co., and unduly preferential to producers at Birmingham, Anniston and Gadsden, Ala.; and Chattanooga, Knoxville and South Pittsburg, Tenn. The examiner further said that the commission should find that the rates from Florence to destinations east of the Mississippi River are not unreasonable, but are unduly prejudicial to the Florence Pipe & Foundry Co. and unduly preferential to producers at the foregoing Southern points. It was further declared that the commission should find that the rates from Chattanooga to destinations east of the Mississippi and north of the Ohio and Potomac rivers, and to destinations in Kentucky, Virginia, West Virginia, North Carolina, South Carolina and Maryland and in the District of Columbia are not unreasonable, but are unduly prejudicial to the Somerville Iron Works and unduly preferential to producers at the other Southern points previously listed. The scales recommended would apply within and between Southern and Official Classification territories.

In the course of his report, Examiner Fuller said:

About 2,000,000 tons of cast iron pipe is produced in this country annually, of which about 75 per cent consists of pressure pipe. Of the total production, about 60 per cent is produced in the South, about 27 per cent in the East and about 13 per cent in Central territory, while only 34 per cent is consumed in the South and West combined, 23 per cent is consumed in the East and 43 per cent in Central territory. Of the tonnage produced by the Southern plants, 19 per cent moves to Southern destinations, 31 per cent to Western destinations, 18 per cent to Eastern destinations and 30 per cent to Central territory. The tonnage produced by the South and East represents about 75 and 90 per cent of their respective capacities. It has only been since 1924 that any considerable tonnage of cast iron pipe has been imported, the imports for that year being 52,528 tons, and for 1926, 93,933 tons.

USES OF METAL SPRAYER

Cleveland Company by Schoop Process Reclaims Defective Machined Parts

Interesting applications of the Schoop process of metal spraying for the repair of castings and machine parts and for adding heat resisting qualities to metals have been made by the Metals Coating Co., Cleveland.

An important function of this process, which has been described in these columns, is the applying of coatings of various metals to metals as a protection against atmospheric corrosion and for decorative purposes. The metal is applied to the surface to be coated or repaired in a very fine spray by a Metalayer, as the apparatus used for the work is known. This is in the form of a gun weighing 3½ lb., in which standard gage wire of almost any metal is automatically fed to the nozzle of the short barrel. There it enters a continuous reducing flame developed from the burning of gas, such as acetylene. When melted it is blown by the compressed air, also delivered to the gun at a high velocity against the surface of the work.

The process is being used successfully by the Cleveland company in building up machine tool parts to overcome the defects caused by the removal of too much metal in machining. The metal is applied in a coating of the desired thickness to the section that is to be built up and then the surface is ground to the proper size. Another example of the work is the building up to the proper dimensions of a forged crank shaft for an automobile with nickel steel. Surfaces of the built-up sections are reground after the coating is applied.

Heat Resisting Coatings to Case Hardening Boxes

Another recent use of the process is the applying of coatings to secure a hard heat resisting metal. Cast iron boxes used in case hardening scale and sometimes warp under the effects of the heat and these have been coated with nickel chrome steel either when new or after they have had some use. Cyanide pots and lead pots have also been given a chrome nickel coating for the same purpose. Aluminum is being similarly applied to pyrometer couples as a heat resisting metal.

A Cleveland motor car manufacturer is now experimenting with the process for putting an aluminum coating on automobile exhaust pipe intakes, manifolds and hot spot castings with the view of having these parts aluminum coated as a substitute for vitreous enameling. It is pointed out that parts already machined sometimes warp when subjected to heat in the enameling operation and that danger of distortion is avoided by the use of the metal coating.

Reclaiming Castings

The Schoop process is being used by the Cleveland company as a substitute for welding, for repairing defects in various castings due to sand and gas holes. In the automotive field it is being used mostly for repairing crank case castings. For automobile repair work the process is said to be proving both successful and economical for repairing scored cylinders, cracked water jackets and leaky radiators. An advantage claimed for the process in repair work of this kind is that no preheating is required.

Work to be coated or repaired is usually taken to the company's plant, but if large castings are to be repaired the apparatus is taken to the work. Most foundries are provided with compressed air and gases needed for doing the work in their plants.

The use of the process for applying decorative coatings on metals has been extended to the coating of materials other than metals. The Cleveland company is using it for putting a bronze coating on plaster of Paris statues and on other pieces of the same or somewhat similar materials used for decorative purposes.

Society Dinners at Detroit Conventions

The American Welding Society will hold its annual dinner at the Book-Cadillac Hotel on Thursday evening, Sept. 22, during its annual convention and the national metal exhibition at Detroit. The guest of honor and principal speaker is to be W. T. Morris, vice-president American Chain Co., whose address will cover "Essentials of Cooperation in Industry."

On Wednesday evening, Sept. 21, at the Book-Cadillac, E. Blough, technical director Aluminum Co. of America, will be the principal speaker at the annual Institute of Metals dinner. The annual dinner of the Drop Forge Supply Association on Wednesday evening, Sept. 21, at the Harmony Club, and the annual banquet of the American Society for Steel Treating on Thursday evening, Sept. 22, at the Hotel Statler, will also contribute to the gaiety of the week.

Semblance of Price War in Europe

Following British Reduction in Pig Iron and Finished Steel, to Check Imports, Germany Cuts Export Iron and Freight Rates

(*By Cable*)

LONDON, ENGLAND, Sept. 5.

CLEVELAND pig iron makers are now granting a 2s. 6d. (60c.) per ton concession to Scottish and export buyers of any quantities. Demand has consequently improved and the outlook is brighter. Hematite is still quiet and large tonnages are obtainable at a reduction of 1s. (24c.) per ton. Foreign ore continues quiet.

The British steel makers' plan of a rebate to home consumers has been adopted to check foreign steel imports and became effective Sept. 1. Under the plan, rebates will be given to all consumers, excluding exporters, who confine their purchases of certain materials to the signatories of the agreement. The rebate will be 7s. 6d. ($1.82) per ton on beams and 5s. ($1.21) on other defined materials, as well as an additional rebate up to 5s. ($1.21) per ton on beams under certain conditions. The plan is being supported by all manufacturers of heavy steel products in the United Kingdom.

Export demand is broadening, with some substantial inquiries in the market. Guest, Keen & Nettlefolds, Ltd., have booked 24,000 tons of rails for Egypt at a little more than £8 ($38.80) per ton, f.o.b. Cardiff, Wales.

The Clyde shipbuilding output in August was 17 vessels of 38,000 tons.

Tin plate is generally quiet, with sales confined to small lots and but little evidence of any broadening in demand. Galvanized sheets are quiet. Black sheets are dull although Japanese buyers are inquiring for early shipments which makers are generally unable to handle because of the well-sold condition of order books.

The Continental market is quiet, but makers are generally maintaining prices and sellers find difficulty in securing concessions. Beams have sold at £4 14s. (1.03c. per lb.) per ton, f.o.b. Antwerp. The Luxemburg July output of pig iron was 225,000 tons and of steel ingots 203,000 tons. There were 41 furnaces in blast on July 31. The French output for July totaled 769,000 tons of pig iron and 677,000 tons of steel ingots. There were 143 blast furnaces in operation Aug. 1.

GERMANY REDUCES PRICES

Follows British Action in Pig Iron — Export Freight Rates Fall

(*By Radiogram*)

BERLIN, GERMANY, Sept. 6.

EXPERTS declare that the highest point in iron and steel production has been reached. The official institute for studying trade fluctuations considers that the general industrial boom has reached its peak.

Home steel market conditions are quieter, although delivery terms are shorter. The steel syndicate's home prices are unchanged, but owing to the Stahlwerkverband's withdrawal from export business, such prices have slightly risen.

The pig iron syndicate has reduced No. 3 foundry iron by 10 per cent and, owing to forcing of English exports, will probably reduce prices of other grades.

The tubes market is dull, especially for export. Home demand of rails is heavy from railroad corporation orders. Scrap is weaker.

The railroads have further reduced freight rates on steel consigned abroad.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd.	£0	19s.				$4.60		
Bilbao Rubio ore†	1	1	to £1	1¼s.		5.09	to	$5.15
Cleveland No. 1 fdy.	3	10				16.97*		
Cleveland No. 3 fdy.	3	7½				16.36*		
Cleveland No. 4 fdy.	3	6½				16.12*		
Cleveland No. 4 forge	3	6				16.00*		
Cleveland basic (nom.)	3	15	to	3	15½	18.18	to	18.30
East Coast mixed	3	14	to	3	15	17.94	to	18.18
East Coast hematite	3	14½	to	3	15½	18.06	to	18.30
Rails, 60 lb. and up	7	15	to	8	0	37.58	to	38.80
Billets	6	0	to	6	10	29.10	to	31.53
Ferromanganese	12	0				58.20		
Ferromanganese (export)	10	15	to	11	0	52.13	to	53.35
Sheet and tin plate bars, Welsh	5	11½	to	5	15	27.03	to	27.88
Tin plate, base box	0	18⅝	to	0	18⅝	4.46	to	4.52
Black sheets, Japanese specifications	13	15	to	14	0	66.68	to	67.90
						C. per Lb.		
Ship plates	7	12½	to	8	2½	1.65	to	1.76
Boiler plates	10	10	to	11	0	2.28	to	2.39
Tees	8	2½	to	8	12½	1.76	to	1.87
Channels	7	7½	to	7	17½	1.60	to	1.70
Beams	7	2½	to	7	12½	1.54	to	1.65
Round bars, ¾ to 3 in.	7	12½	to	8	2½	1.65	to	1.76
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	10	0	to	10	5	2.17	to	2.22
Galv. sheets, 24 gage	13	15	to	14	0	2.98	to	3.03
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.03	to	3.09

*Export price, 2½s. less for 500 tons or more.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	0s.	to £3	0½s.		$14.55	to	$14.67
France	3	0	to 3	0½		14.55	to	14.67
Luxemburg	3	0	to 3	0½		14.55	to	14.67
Basic pig iron:								
Belgium	2	18	to 2	19		14.06	to	14.30
France	2	18	to 2	19		14.06	to	14.30
Luxemburg	2	18	to 2	19		14.06	to	14.30
Coke	0	18				4.37		
Billets:								
Belgium	4	6	to	4	8	20.85	to	21.34
France	4	6	to	4	8	20.85	to	21.34
Merchant bars:						C. per Lb.		
Belgium	4	14	to	4	16	1.03	to	1.06
France	4	14	to	4	16	1.03	to	1.06
Luxemburg	4	14	to	4	16	1.03	to	1.06
Joists (beams):								
Belgium	4	13	to	4	14	0.98	to	1.03
France	4	13	to	4	14	0.98	to	1.03
Luxemburg	4	13	to	4	14	0.98	to	1.03
Angles:								
Belgium	4	13	to	4	14	1.01	to	1.03
¼-in. plates:								
Belgium (a)	6	6	to	6	7½	1.38	to	1.40
Germany (a)	6	6	to	6	7½	1.38	to	1.40
⅜-in. ship plates:								
Belgium	6	1				1.31		
Luxemburg	6	1				1.31		
Sheets, heavy:								
Belgium	6	1				1.31		
Germany	6	1				1.31		

(a) Nominal.

FRENCH EXPORTS LARGER

Domestic Buying Still Small—German Commercial Treaty Expected to Aid Business

PARIS, FRANCE, Aug. 26.—Prices are showing more stability and the condition of foreign trade has led to considerable optimism. Imports have increased in tonnage but decreased in total value, according to recently published statistics for the first seven months of the year, and export tonnage has been larger in July than in any month since last February. The ending of the summer holiday period is expected to result in an early increase in purchasing, which should lend still greater stability to the market. A further factor of improvement may lie in the Franco-German commercial treaty, which has been signed by the representatives of the two governments and now awaits ratification. While the treaty is generally considered imperfect in many ways, it reestablishes normal trade relations between the two countries and it is considered better than nothing.

Pig Iron.—Sales of phosphoric foundry iron in July were heavy and the entire allotment for domestic foundries was absorbed. This is a continuation of the improvement that has been in evidence since May. Prices have been maintained and are unchanged for September, with the September allotment at the August level of 30,000 metric tons for the home market. Sales of hematite were smaller than of phosphoric foundry iron, but the total of business was better in July than in previous months. In August, however, shipments of hematite have been small. As a result producers have decided to lower the price of forge iron and spiegeleisen by 10 fr. (40c.) per ton.

Agreement has not yet been reached on the demand of the De Wendel company for a quota of pig iron in the domestic market. In the past, this interest has operated one furnace on foundry grade, all the output going for export. Recently the company decided to enter into competition for domestic tonnage and asked the pig iron entente for a quota. Negotiations, however, are continuing and an amicable settlement is expected. Export of pig iron is quiet and competition of German and British sellers is a factor.

Semi-Finished Material.—Prices are fairly firm but only because of the recent curtailment of operations, which has given most mills a backlog of from three to four weeks work. For export, prices are slightly firmer than in July. Billets are quoted at £4 5s. to £4 8s. ($20.61 to $21.34) per metric ton and blooms at £3 19s. to £4 2s. ($19.15 to $19.88) per metric ton, f.o.b. Antwerp.

Finished Material.—Purchasing is confined to small lots, especially by merchants. Expectation of lower prices is apparently no longer the cause of abstention from buying as most consumers readily admit that the market is probably at its lowest level. Buyers, however, do not expect an early advance in price and with their needs at a low level are not inclined to build up stocks that might not be consumed for many months. For export, prices are stronger and show an average advance of 1s. per ton since the first of the month. Sellers are unwilling to grant concessions. Beams range from £4 10s. to £4 13s. per metric ton (0.99c. to 1.02c. per lb.) and bars from £4 14s. to £4 15s. per ton (1.03c. to 1.04c. per lb.), f.o.b. Antwerp. With prices considerably lower than the British market, United Kingdom consumers are beginning to return to Continental markets as purchasers of fairly sizable tonnages.

Exports.—A total of 68,454 metric tons of pig iron was exported in July, none of which went to the United States. Of the shipments of 517,231 metric tons of pig iron in the first seven months of this year, only 183 tons went to the United States. Of the exports of rolled products, both finished and semi-finished, of the 221,370 metric tons shipped in July, 3912 tons went to the United States and of the 1,680,630 tons shipped in the first seven months, the United States took 18,120 tons. Exports of rails totaled 33,874 metric tons in July and 231,073 tons in the first seven months. Japan was the leading buyer of French rails, taking 6533 tons in July and a total of 25,275 tons in the first seven months. Only 637 metric tons went to the United States in the first seven months of the year. Of exports of 29,520 tons of castings in July the United States received 2490 tons, while 20,244 metric tons of the 178,460 tons exported in the first seven months went to the United States.

LUXEMBURG MARKET QUIET

Export Business Quiet and Prices Show Softness —Fall Improvement Expected

LUXEMBURG, Aug. 26.—The slight improvement in the market, which appeared early in July, has not been maintained and prices have again decreased, especially for merchant steels. Purchases for export to India are expected to begin about the end of August or early in September, which should be of aid in developing firmness in the market. Some recent export orders have been handled at rather low prices. Purchases from Japan are still small as a result of the financial difficulties of that country following the crisis in May. The Chinese situation continues uncertain and Hong Kong is about the only Chinese market showing satisfactory activity. Orders from the United States have been much smaller than in recent months.

Most producers are resisting the efforts of purchasers to secure lower prices and although buying is limited, prices are fairly stable. Bars, rods and shapes have shown slightly greater strength since early in the month. With the summer vacation period over, sellers look forward to a definite improvement in demand.

The pig iron market is quiet and only moderate activity is evident in semi-finished materials, both buyers and sellers showing extreme caution in making commitments for the future.

The July production of pig iron was 225,226 metric tons with 41 of a total of 47 furnaces in blast at the end of the month. Output of steel ingots totaled 202,987 metric tons.

French Deny Prospect of Cast-Iron Pipe Syndicate

PARIS FRANCE, Aug. 26.—The recent report from Germany that an international syndicate of cast iron pipe makers was being discussed on the Continent is denied by French interests. An outstanding figure in the French cast iron pipe industry, recently interviewed by a representative of THE IRON AGE, said that "at first we thought that there was confusion with the International Syndicate of Steel Pipe Makers, which had just been organized. On second thought, however, it was decided that no confusion had been possible in this matter and as this news came from Germany we believed we could discern an effort by competitors to sound out the prospects of open discussions of this matter. We repeat that until now there has not even been a rumor of such negotiations."

Germany Makes Record Open-Hearth Output

HAMBURG, GERMANY, Aug. 20.—In July German production of open-hearth steel reached a new high level with 731,156 metric tons. This is a larger output of open-hearth steel than ever before in Germany. Another high point in the July production was the figure for output of electric furnace steel with 12,170 metric tons, the largest since 1918. The total output of steel in July was 1,361,785 metric tons, compared with 1,327,976 tons in June, 1926, and 1,019,338 tons in July, 1926. Production of finished products was 1,049,439 tons in July compared with 1,062,529 tons in June and 864,203 tons in July of 1926. This continued high production of the German steel industry will probably mean $1,500,000 further penalties in the International Steel Cartel for overproduction in the fourth quarter.

All the non-ferrous metal products manufacturers in Austria, five companies, have merged with the largest German company, the Mansfeld A. G.

Machinery Exports Gain

July Total $6,000,000 Above June—Imports Decline—Large Increase in Exports of Oil Well Machinery

WASHINGTON, Sept. 6.—Making a gain of $5,929,748, exports of machinery of all kinds in July of the present year aggregated $40,222,514, as compared with $34,392,766 in June. For the seven months ended with July, machinery exports were valued at $252,065,364, compared with $237,963,707 for the corresponding period of 1926.

Industrial machinery exports as classified by the division of statistics, Department of Commerce, were valued at $18,773,102 in July, as against $15,829,274 in June. As classified by the industrial machinery division, exports of this type of machinery in July were valued at $17,073,000, a gain of practically $3,000,000 over June. Exports of power-driven metal working machinery in July were valued at $1,318,401, compared with $1,496,908 in June. Exports of machine tools in July numbered 656, valued at $1,142,927, as against 531, valued at $870,821, in June.

Imports of machinery and vehicles in July were valued at $1,677,812 in July, compared with $2,293,115 in June. As listed by THE IRON AGE, machinery imports in July were valued at $1,139,946, as against $1,442,972 in June. Imports of machinery carried in THE IRON AGE list were valued at $12,432,189 for the seven months ended with July of the current year, as against $10,793,002 for the corresponding period of last year.

A feature of the export movement was a gain in shipments of oil well machinery with a value of $1,971,485 in July of the present year, as against $987,853 for the corresponding month of 1926. For the seven months ended with July of the present year oil well machinery exports were valued at $11,923,721, compared with $8,021,731 for the corresponding period of last year. An increase of more than $500,000 was made in the value of shipments of metal-working machinery in July as against the preceding month, while for the seven months the increase was $2,300,000.

Machinery Exports from the United States

(In Thousands of Dollars)

	July		Seven Months Ended July	
	1927	1926	1927	1926
Locomotives	$216	$370	$4,157	$3,036
Other steam engines	82	72	857	540
Boilers	113	174	1,097	1,037
Accessories and parts	31	182	290	947
Automobile engines	837	815	7,973	9,055
Other internal combustion engines	717	1,225	3,617	5,131
Accessories and parts	277	45	2,269	198
Electric locomotives	51	20	582	1,523
Other electric machinery and apparatus	587	661	4,723	4,218
Excavating machinery	483	382	2,687	2,888
Concrete mixers	85	88	719	472
Road-making machinery	188	187	1,404	1,167
Elevators and elevator machinery	424	457	2,894	3,015
Mining and quarrying machinery	1,276	1,153	8,069	9,349
Oil well machinery	1,971	988	11,924	8,022
Pumps	712	492	3,739	3,615
Lathes	495	164	1,663	1,032
Boring and drilling machines	82	56	616	479
Planers, shapers and slotters	30	35	370	217
Bending and power presses	128	116	699	591
Gear cutters	63	50	457	295
Milling machines	98	37	701	33
Thread-cutting and screw machines	99	85	513	430
Forging machines	71	107	546	683
Sharpening and grinding machines	339	148	2,094	1,238
Other metal-working machinery and parts	425	372	2,745	2,654
Textile machinery	1,069	881	6,258	6,675
Sewing machines	781	686	5,456	5,043
Shoe machinery	193	120	962	800
Flour-mill and gristmill machinery	84	46	318	542
Sugar-mill machinery	475	271	1,804	1,653
Paper and pulp mill machinery	179	281	2,422	1,654
Sawmill machinery	93	72	481	628
Other woodworking machinery	177	75	845	722
Refrigerating and ice-making machinery	684	589	4,745	2,793
Air compressors	587	391	3,564	2,894
Typewriters	1,745	1,401	12,425	11,446
Power laundry machinery	207	74	978	862
Typesetting machines	487	320	2,402	2,153
Printing presses	428	554	3,451	4,053
Agricultural machinery and implements	9,666	7,328	51,914	55,452
All other machinery and parts	13,487	12,518	86,636	78,729
Total	$40,223	$34,088	$252,065	$237,964

United States Exports and Imports of Machinery

	Exports of Machinery	Imports of Machinery	Exports of Power-Driven Metal Working Machinery
The year 1924	$317,040,424	$9,711,618	$8,644,444
The year 1925	385,376,676	11,577,911	13,052,916
1926			
January	34,590,693	1,685,580	1,206,125
February	32,269,707	1,476,598	1,294,934
March	35,241,960	1,714,234	1,297,616
April	38,755,467	1,814,021	1,479,337
May	32,707,863	1,494,156	1,004,298
June	30,498,054	1,484,127	1,024,252
Fiscal year	398,306,436	15,413,144	16,046,267
July	34,123,992	1,327,874	1,318,556
August	32,459,844	1,453,909	1,326,443
September	36,901,003	1,432,378	1,145,406
October	27,965,148	1,247,115	1,069,343
November	32,694,793	1,210,868	1,274,446
December	32,140,569	1,373,234	1,202,069
The year 1926	400,167,883	17,137,056	14,315,695
1927			
January	33,433,429	1,640,177	1,495,455
February	29,575,096	1,483,713	1,121,256
March	38,915,857	1,540,356	1,326,260
April	39,793,078	1,840,163	1,798,880
May	35,969,289	2,663,943	1,494,808
June	34,392,766	1,442,972	1,496,908
Fiscal year	392,901,306	18,658,401	16,069,944
July	40,222,514	1,139,946	1,318,401
Seven months	252,065,364	12,432,189	10,047,444

Imports of Machinery into the United States

(By Value)

	July		Seven Months Ended July	
	1927	1926	1927	1926
Metal-working machine tools and parts	$20,484	$44,323	$257,541	$279,446
Agricultural machinery and implements	239,668	286,682	3,802,983	3,584,774
Electrical machinery and apparatus	161,462	85,862	1,713,302	536,892
Other power-generating machinery	69	298	7,884	3,729
Other industrial machinery	493,775	750,230	5,268,454	5,184,071
Vehicles, except agricultural	224,488	159,089	1,382,025	1,204,090
Total	$1,139,946	$1,326,484	$12,432,189	$10,793,002

Exports of Power-Driven Metal-Working Machinery

	July, 1927		June, 1927	
	No.	Value	No.	Value
Engine lathes	60	$245,288	48	$94,168
Turret lathes	69	175,697	16	31,718
Other lathes	32	74,293	39	57,721
Vertical boring mills and chucking machines	6	22,571	16	37,598
Thread-cutting and automatic screw machines	93	94,874	47	36,565
Knee and column-type milling machines	27	30,449	9	14,453
Other milling machines	44	67,764	38	74,979
Gear-cutting machines	62	62,661	34	85,248
Vertical drilling machines	20	23,812	17	24,287
Radial drilling machines	8	10,669	9	22,230
Sensitive drilling machines	20	2,406	15	698
Other drilling machines	47	22,880	71	30,759
Shapers and slotters	18	25,154	28	44,953
Planers	6	4,450	4	6,142
External cylindrical grinding machines	48	121,430	44	150,271
Internal grinding machines	44	125,766	62	133,238
Metal-working tool-sharpening machines	52	32,763	34	25,793
Total	656	$1,142,927	531	$870,821

Machinery Markets and News of the Works

SLIGHT IMPROVEMENT

Machine Tool Purchases and Inquiries Gain

J. I. Case Threshing Machine Co. Issues List of Dozen Items—Sharon Steel Hoop Co. to Equip Shops

PURCHASES of machine tools have shown a slight gain in the past week and inquiries are more numerous, but the extent of the improvement does not yet denote any general upward swing. Two of the outstanding developments of the week are the issuance of a list of a dozen tools required by the J. I. Case Threshing Machine Co., Racine, Wis., and announcement that the Sharon Steel Hoop Co., Sharon, Pa., will equip machine shops at Sharon and at Lowellville, Ohio; about 12 tools are to be bought.

Manufacturers of airplanes and motors are rushed with orders and have been among the buyers of tools in the past week. Automobile companies are buying very sparingly. Railroad orders likewise amount to very little. The Santa Fe has bought two forging machines and the Chicago, St. Paul, Minneapolis & Omaha has ordered a carwheel borer. The New York Central is an occasional buyer.

The Wisconsin Steel Works, South Chicago, is in the market for two planers. The Board of Education, Chicago, will buy a band saw and a floor grinder.

The Erie Forge Co., Erie, Pa., has bought a 60-in. extra heavy planer and the Toledo Machine & Tool Co., Detroit, ordered a No. 7 Newark gear cutter.

New York

NEW YORK, Sept. 6.

THERE has been a slight increase in the number of inquiries for single tools and purchasers are showing more inclination to close business than for some time. Manufacturers of airplanes and motors in this district have been quite active lately in continued purchasing of separate tools. Of four outstanding manufacturers in this line, three have been purchasers in recent weeks. The Wright Aeronautical Corporation of America has closed on two turret lathes and in the past fortnight or more has purchased several milling machines, grinders and an automatic lathe. The Fairchild Caminez Engine Co., New York, has been a buyer of similar tools and a Connecticut manufacturer of airplane engines has closed on an automatic lathe.

The railroads continue inactive with only occasional purchases by the New York Central. The list of the Norfolk & Western Railroad is not yet reported in the market. The Chicago, St. Paul, Minneapolis & Omaha has purchased a carwheel borer. Among industrial purchases are a used 32 x 32 x 12 in. planer by a chemical company in Michigan and a used horizontal boring and drilling machine with a 6-in. spindle by a Youngstown, Ohio, engineering company. A manufacturer in Michigan has closed on four worm grinders, a Detroit automobile builder on two thread millers, a Cincinnati watch manufacturing company on a bench miller and the New Haven Clock Co., New Haven, Conn., on a bench lathe and a bench miller.

Harry Tanenbaum, 490 Main Street, New Rochelle, N.Y., architect, has plans for a new one-story automobile service, repair and garage building at Peekskill, N. Y., to cost about $100,000 with equipment.

The Zimmer Mfg. Co., 59 Beekman Street, New York, manufacturer of printers' equipment and supplies, has acquired a five-story building, 25 x 105 ft., at 72 Beekman Street, and will remodel for a new plant. It is understood that the present works will be removed to the new location.

The New York City Airport, Inc., 51 East Forty-second Street, New York, T. E. Donovan, head, has approved plans for a new airport at Flushing, L. I., with group of hangars, machine and repair shops, oil storage and distributing, and other buildings, to cost in excess of $200,000. L. C. Smith, 444 Jackson Avenue, Long Island City, is engineer.

Louis A. Sheinart, 194 Broadway, New York, architect, has plans for a two-story automobile service, repair and garage building on Gouveneur Slip, to cost approximately $90,000 with equipment.

The Nevada Consolidated Copper Co., 25 Broad Street, New York, has begun preliminary work on a new underground mining plant at its Ruth copper mines at Ely, Nev., to cost in excess of $750,000 with mining, conveying and other equipment.

The Eastern Wire & Cable Co., New York, care of Wylie Brown, 233 Broadway, vice-president, recently formed under Delaware laws, has arranged for the purchase of a controlling interest in the Habirshaw Cable & Wire Corporation, New York, with plants at Yonkers, N. Y., and Bridgeport, Conn. Operations will be continued at both factory units. Officials of the purchasing company will be active in the managementt, these including William C. Robinson and I. A. Bennett, both of Pittsburgh, president and secretary, respectively, and Franklin S. Jerome, Seymour, Conn., treasurer.

The New Rochelle Water Co., New Rochelle, N. Y., has arranged for a preferred stock issue of $450,000, a portion of the fund to be used for expansion, including power and pumping facilities, etc.

The Cities Service Power & Light Co., 60 Wall Street, New York, operated by the Cities Service Co., same address, is arranging for a bond issue of about $24,000,000, a portion of the proceeds to be used for expansion in electric light and power properties.

The Henry V. Walker Co., 17 John Street, New York, manufacturer of lacquers, etc., has asked bids on a general contract for a new one- and three-story plant at Elizabethport, N. J., to cost about $45,000 with equipment. William Finne, 91 Broad Street, Elizabeth, N. J., is architect and engineer.

The Ransome Concrete Machinery Co., Second Street, Dunellen, N. J., has awarded a general contract to Adam Valentine, 201 East Fifth Street, Plainfield, N. J., for a new three-story building at its plant, to cost close to $50,000. J. P. Faber is company engineer.

The Public Service Electric & Gas Co., Public Service Terminal, Newark, has applied for permission to issue bonds in amount of $10,000,000 and stock to total $20,000,000, the majority of the proceeds to be used for extensions and betterments in power plants, systems and affiliated properties.

Fire, Aug. 26, destroyed a portion of the plant of the Branchville Supply Co., Branchville, N. J., building materials, with loss reported in excess of $80,000, including hoisting engine, conveyors and other handling equipment.

The New York office of the Blaw-Knox Co., Pittsburgh, will be located in the Canadian-Pacific Building 342 Madison Avenue, effective Oct. 1.

Charles Maiers & Sons, 59 Sixteenth Avenue, Newark, N. J., have been incorporated to extend their business in the manufacture of fine tools for the industrial arts, such as carving, linoleum block, modeling, plaster and engraving tools.

The Dobbins Machine Gun Corporation of New York, 74 Trinity Place, New York, has been organized to manufacture machine gun devices for the fortification against burglaries and hold-ups of stores and residences. The company is receiving bids on the manufacture of these guns for sale in the East and is desirous of getting figures on some additional die-castings dies.

The New York Telephone Co., 140 West Street, New York, is said to be planning the construction of a one-story equipment storage and distributing plant, with repair facilities and service and garage building, at Flushing, L. I., to cost in excess of $65,000 with equipment.

Philadelphia

PHILADELPHIA, Sept. 5.

THE John Warren Watson Co., Twenty-fourth and Locust Streets, Philadelphia, recently organized under State laws to take over and expand the company of the same name, manufacturer of shock absorbers, has arranged for a stock issue to total $4,900,000, a portion of the fund to be used for expansion.

The Fodey Box Co., Twenty-fifth and Tasker Streets, Philadelphia, manufacturer of metal reinforced and other wooden packing boxes and cases, has leased a tract of about 15,000 sq. ft., and is reported planning erection of a new plant unit, to cost in excess of $40,000 with equipment.

The J. G. Lorenz Corporation, 1011 Chestnut Street, Philadelphia, manufacturer of iron and steel products, has awarded a general contract to the Farrell-Roth Co., Walnut and Twenty-first Streets, for a new plant, comprising a main one- and two-story unit 40 x 100 ft., and 50 x 265 ft. respectively, and one-story building, 36 x 97 ft., to cost $100,000 with equipment.

The Reading Co., Reading Terminal, Philadelphia, has plans under way for the electrification of its Chestnut Hill branch, and is understood to be arranging a call for bids within 60 to 90 days. The project is reported to cost more than $500,000. G. I. Wright is engineer of electric traction for the company, address noted.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has awarded a general contract to H. L. Baton, 1713 Sansom Street, for extensions and improvements in its motor bus service, repair and garage building to cost about $150,000. Additional equipment will be installed.

The Camden Rail & Harbor Terminal Corporation, Camden, N. J., care of Frederick Cohen, Merchantville, N. J., organized a few months ago by Mr. Cohen and associates as the Camden Terminal Corporation and later arranging change of name, is completing plans for a new ice-manufacturing and cold storage plant at Camden, with power plant for operation on adjoining site, to cost about $2,000,000 with machinery. The main unit will be nine stories, 100 x 250 ft. It is proposed to begin work within the next 30 to 60 days.

The Pennsylvania Power & Light Co., Allentown, Pa., is reported to be completing plans for a proposed super-power steam operated electric generating plant at Hummel's Wharf, near Sunbury, Pa., to cost in excess of $1,000,000 with transmission system.

The Board of School Commissioners, Benton, Pa., will take bids within a few weeks for its two-story vocational high school to cost about $70,000, for which plans are being completed by Walter Witman, Keystone Building, Harrisburg, Pa., architect.

The Camden County Board of Education, 151 Broadway, Camden, N. J., has received a low bid from George Bachman, Camden, for its proposed two-story vocational school on the Browing Road, Pensauken, Merchantville, at $813,131. It is proposed to begin work soon. The entire project will cost about $950,000 with equipment. Lackey & Hettle, 5 Hudson Avenue, Camden, are architects.

The Automobile Sales Co., Wilmington, Del., local representative for the Pierce-Arrow automobile, has plans for a new service, repair and sales building, consisting of two units, 35 x 110 ft., and 80 x 80 ft., the latter to be equipped as a shop. The project will cost close to $90,000 with equipment. Roscoe C. Trindall, Wilmington, is architect.

The Department of Parks and Public Property, Allentown, Pa., is asking bids until Sept. 27 for low lift pumping machinery, consisting of units with capacities of 10, 6 and 4-million gal. per day, with accessory equipment. Morris Knowles, Inc., Westinghouse Building, Pittsburgh, is engineer.

The Department of Property and Supplies, Capitol Building, Harrisburg, Pa., B. E. Taylor, secretary, is asking bids until Sept. 21 for a new high pressure water-tube boiler, with superheater, chain grate stoker, soot blower, and other steam specialties and supplies.

The Board of Trustees, Pennsylvania State College, State College, has authorized plans for a new two-story engineering building to cost about $200,000 with equipment. Charles Z. Klauder, 1429 Walnut Street, Philadelphia, is architect.

The Stoker Engineering Co., Wister Street and Godfrey Avenue, Germantown, Philadelphia, has been organized to make a semi-automatic furnace stoking machine for use in residences and small industrial plants. The company has its own plant, but considerable work is contracted for. Later it expects to manufacture all parts.

The plant, machinery and equipment of the Sheldon Axle & Machine Co., Wilkes-Barre, Pa., will be sold at auction by the bankruptcy trustee Sept. 19-22. About 1000 standard machine tools will be offered for sale and other equipment will include hammers, punch presses, hydraulic presses, upsetters, bull-dozers, shears and foundry equipment.

New England

BOSTON, Sept. 5.

SALES by local machine tool dealers the past week were practically at a standstill, business being confined for the most part to small inexpensive and used machines. While there has not been any marked expansion in the number of inquiries, sentiment is much more hopeful than it has been in two months and it is thought by many in the trade that September will see quite an improvement in machine tool sales. There was a noticeable drop in sales of small tools in the closing days of August.

Alterations are being made at the plant of the Heald Machine Co., Worcester, to accommodate the grinding equipment of the Giddings & Lewis Machine Tool Co., recently acquired.

The Pneumatic Drop Hammer Co., Boston, has a repeat order from an Indiana company for one of its large air lift drop hammers.

The Bay State Tool Co., Springfield, Mass., will build a machine shop on Westland Avenue and Albany Street, to cost about $20,000 complete.

The Kirby Mfg. Co., Middletown, Conn., manufacturer of bell toys, chimes, etc., has acquired the former plant of the Elam Strong Paper Box Co., Middletown, which it will equip for manufacturing.

The Metropolitan Ice Co., 321 Washington Street, Somerville, Mass., contemplates the erection of an artificial ice making plant. Plans will be private.

Bids close Sept. 30 on a five-story, 40 x 98 ft., manufacturing plant for the American Fastener Co., 54 Maple Street, Waterbury, Conn. C. Jerome Bailey, 63 Bank Street, Waterbury, is the architect.

The Wire Machinery Corporation of America, New Haven, Conn., has taken over the business and assets of the New England Wire Machinery Co. Raymond B. Gerard is president.

The American Reinforced Paper Co., County Street, Attleboro, Mass., is arranging an early call for bids for a new one-story plant, to cost more than $60,000 with equipment. Charles T. Main, 201 Devonshire Street, Boston, is architect and engineer.

Officials of the Gurney Heater Mfg. Co., 93 Oliver Street, Boston, have organized the Gurney Heater Mfg. Corporation to expand operations in the New York district, where headquarters of the new company will be located.

Ovens, power equipment, conveying and other machinery will be installed in the new two-story plant to be erected at East Hartford, Conn., by the Continental Baking Co., 65 East Cottage Street, Boston, to be 140 x 195 ft., and to cost upward of $125,000 with equipment. Mills, Rhines, Bellman & Nordhoff, Ohio Building, Toledo, Ohio, are architects.

The Cadillac Motor Car Co., Detroit, has asked bids on general contract for a new two-story service, repair and sales building at Brookline, Mass., to cost more than $100,000 with equipment. Boston headquarters of the company are at 664 Commonwealth Avenue. Albert Kahn, Marquette Building, Detroit, is architect.

Sperry & Barnes, New Haven, Conn., have plans for a two-story steam power house at their plant on the Long Wharf, to be 36 x 53 ft., to cost approximately $27,000 with equipment.

The Victor Furniture Co., Gardner, Mass., has awarded a general contract to Blouin & Choteau, Gardner, for an addition to its plant to cost more than $75,000 with equipment.

The Golding-Keene Co., Keene, N. H., operating local feldspar properties, is planning for expansion in operations,

The Crane Market

INQUIRY for overhead cranes has declined somewhat in the past week and the locomotive crane field continues quiet. Some improvement in the volume of inquiry for cranes seems to be expected after Labor Day. The National Bridge Co., Long Island City, New York, which has been in the market for a 10-ton electric traveling crane is expected to close shortly and the Erie Railroad is reported still in the market for a 15-ton overhead crane for Hornell, N. Y. The two standard locomotive cranes and one crawl-tread crane for the New York Central Railroad have not yet been closed and it is reported that only one of the standard locomotive cranes may be purchased. The Otis Elevator Co., Yonkers, N. Y., is understood to have closed on 25 or more 1-ton hand power cranes with electric hoists.

The Heil Co., Milwaukee, is in the market for a 3-ton overhead crane for its Boston warehouse, 298 North Harvard Street, Boston. Indications are that quite a number of small cranes may be purchased in the New England district this month and several of large capacity may be closed.

Among recent purchases are:

General Electric Co., Schenectady, N. Y., two 10-ton electric traveling cranes reported purchased from the Niles Crane Corporation.

Egleston Brothers & Co., Long Island City, New York, a 10-ton, 65-ft. span double trolley, electric traveling crane from the Niles Crane Corporation.

Stone & Webster, Boston, a 30-ton overhead crane for Hartford, Conn., reported purchased from the Niles Crane Corporation.

American Gas & Electric Co., Philo, Ohio, a 20-ton electric overhead crane from the Milwaukee Electric Crane & Mfg. Corporation.

Mechanical Mfg. Co., Chicago, a special crane from the Shaw Electric Crane Co.

including the installation of electrically operated mining equipment. The company has contracted with the Public Service Co. of New Hampshire for power supply and will abandon the operation of its former isolated steam power house.

South Atlantic States

BALTIMORE, Sept. 5.

BIDS will soon be asked by the Bethlehem Shipbuilding Corporation, South and Water Streets, Baltimore, Md., for a one and two-story addition, to cost more than $100,000 with equipment. J. M. Willis is general manager.

The Brunswick Automatic Gas & Equipment Co., Brunswick, Ga., care of J. W. Walker, Brunswick, has leased local factory property, and will remodel for a new plant for the manufacture of isolated gas-generating plant for rural domestic service. The initial plant is reported to cost more than $40,000.

The Board of District Commissioners, District Building, Washington, is asking bids until Sept. 13 for the construction of a water tower at the local Reno reservoir, with capacity of 125,000 cu. ft.

The Celluloid Co., Cumberland, Md., has been formed by officials of the Celanese Corporation of America, Amcelle, near Cumberland, to take over its subsidiary, the Safety Celluloid Corporation, and the Celluloid Co., Newark, N. J., and consolidate. The new organization has plans under way for a new mill for the production of celulose acetate at Cumberland, to cost close to $2,000,000 with machine shop, power house and auxiliary building. F. T. Small is engineer for the parent company, and Arthur J. Fitch, works manager.

The American Wood Products Co., Marion, S. C., a subsidiary of the American Box Co., 1900 West Third Street, Cleveland, has acquired property at the junction of the Raleigh & Charleston, and Atlantic Coast Line railroads, as a site for a new veneer mill, to cost about $50,000 with machinery.

Louis A. Tarr, Inc., 322 Sharp Street, Baltimore, machinery dealer, has inquiries out for a double-drum hoisting engine, gasoline-operated, about 35-hp. capacity, with swing-gear, etc., complete; Clyde type preferred.

T. Worth Jamison, Jr., 12 East Pleasant Street, Baltimore, architect, has plans for a one-story automobile service, repair and garage building, reported to cost close to $90,000 with equipment.

The Chesapeake Paper Board Co., Key Highway and the Baltimore & Ohio Railroad, Baltimore, will take bids in about 30 days for a one-story addition and improvements in present mill, to cost about $80,000 with machinery. William W. Kerner is secretary.

The Commercial Pigments Corporation, 17 East Forty-second Street, New York, has work under way on a new plant in the Curtis Bay district, Baltimore, to cost in excess of $100,000 with equipment. General contract recently was let to the Bedford Construction Co., 200 East Illinois Street, Chicago.

Haskel H. Martin, Vickers Building, Greenville, S. C., architect, has completed plans for a two-story automobile service, repair and garage building, 75 x 145 ft., with foundations for two additional stories, reported to cost about $65,000 with equipment.

The Old Dominion Soapstone Co., 815 Continental Building, Baltimore, Ernest L. Dinning, president and treasurer, will make extensions and improvements in properties at Clifton Station, Va., including rebuilding of portion of mill and installation of additional equipment. The company plans to begin operations early in October.

Henry A. Berliner, Potomac Flying Service, Inc., Hoover Field, South Washington, Va., near Alexandria, is at the head of a project to construct and operate a new aircraft manufacturing plant in this vicinity. It is understood that a building is being leased for the initial works, to have a capacity of about 8 to 10 three-passenger planes per month. Later it is purposed to build a plant.

The Kent-Coffey Mfg. Co., Lenoir, N. C., manufacturer of furniture, has awarded a general contract to the Poe-Triplett Construction Co., Lenoir, for a two-story and basement addition, totaling about 35,000 sq. ft. of floor space, and three-story structure, aggregating about 15,000 sq. ft. floor space. The first unit will be used as a machine department and the other for finishing operations. The cost is estimated at more than $100,000 with machinery.

Detroit

DETROIT, Sept. 5.

PLANS have been filed by the Olds Motor Works, Lansing, Mich., for several new shop units, in its proposed expansion program, to cost in excess of $500,000 with equipment. General contract has been let to the Reniger Construction Co., Lansing.

Motors, power equipment, conveying and other machinery will be installed in the new two-story and basement printing plant, 60 x 140 ft., to be erected by the Booth Publishing Co., Buhl Building, Detroit, at Muskegon, Mich., to cost close to $200,000 with equipment.

The Mullins Body Corporation, General Motors Building, Detroit, with main plant at Salem, Ohio, is planning for increase in production in automobile bodies, fenders, etc., and will use the plant of the Sterling Mfg. Co., recently acquired, for expansion.

The American Nut Co., 676 West Grand Boulevard, Detroit, manufacturer of steel and brass bar nuts and kindred products, will soon begin superstructure for a new two-story unit, to cost more than $50,000, for which plans have been completed by Charles Noble, Lafayette Building, architect.

The Maring Wire Co., Muskegon, Mich., manufacturer of magnet and other electrical wires, has disposed of a bond issue of $250,000, a portion of the fund to be used for expansion in output.

The Packard Motor Car Co., East Grand Boulevard, Detroit, has filed plans for a new three-story and basement building, 170 x 380 ft., to cost about $150,000, for which general contract has been let to the Everett Winters Co., 1651 East Grand Boulevard.

The Stinson-Northville Airport Syndicate, Northville, Mich., will proceed with the construction of an airport, for which site has been acquired. It will include hangars, machine and repair shops, oil houses and other mechanical buildings.

The Standard Aluminum Casting Co., Lansing, Mich., is planning expansion in production and will establish a division of its works for the manufacture of aircraft parts. A new heat-treatment department has been arranged and other facilities will be provided.

Pittsburgh

PITTSBURGH, Sept. 5.

THE machine tool trade does not yet feel any material improvement in business which, in general, still runs more to repair parts and small machines with only occasional orders of any importance. The prospect is regarded as good, as there are a number of projected machine shops and shop rehabilitations. There is much interest in the plans of the Sharon Steel Hoop Co., which some time ago asked for prices for estimating purposes for several motor-driven tools for a new shop to be built at the Sharon works, and it is now figuring on enlarging its shop at Lowellville, Ohio. More than a dozen tools will be wanted for the two projects.

The Andrews-Bradshaw Co., 530 Fourth Avenue, Pittsburgh, manufacturer of steam specialties, has acquired the entire property, plant and patents of the Tracy Engineering Co., 485 Sixth Avenue, San Francisco, manufacturer of kindred products, for which it has heretofore acted as sales agent. Arrangements have been made for the transfer of the business to Pittsburgh and plant property has been secured at Forty-ninth and Harrison Streets for this purpose. The factory will be operated as a separate unit for the production of the Tracy specialties. R. N. Robertson, formerly chief mechanical engineer of the American Smelting & Refining Co., has become associated with the company as chief engineer.

Ovens, power equipment, conveying and other machinery will be installed in the new three-story plant to be erected by the Grennan Bakeries, Inc., 6016 Rodman Street, Pittsburgh, to cost more than $150,000 with equipment.

The Bruce Perry Motor Co., Huntington, W. Va., has leased a new three-story building, 80 x 160 ft., to be erected on Fourth Avenue, for which plans have been filed, and will establish a new service, repair and garage building. The entire project will cost about $85,000.

The Iron City Electric Co., 436-38 Seventh Avenue, Pittsburgh, electrical equipment and appliances, has acquired property 50 x 117 ft., for a new seven-story and basement storage, distributing and headquarters building, to cost in excess of $300,000. It is expected to begin work in October. Hunting, Davis & Dunnells, Century Building, are architects and engineers.

In connection with a new service and operating building, the Alco Tire Co., 3301 Bigelow Boulevard, Pittsburgh, will install electrical machinery for repairing, vulcanizing and other service. The new structure is scheduled for completion in October, and will cost more than $75,000.

The Board of Education, Belpre School District, Parkersburg, W. Va., plans the installation of manual training equipment in a proposed new high school to cost $125,000. A site has been selected and plans will soon be drawn.

The Limbaugh Ogden Motor Co., 131 Ridge Avenue, Crafton, Pa., has completed plans for a two-story addition to its service and repair division, to cost about $50,000 with equipment. E. H. Dobson, 116 South Birmingham Avenue, Avalon, Pa., is engineer.

The Murdock-Chevrolet Co., 3415 Forbes Street, Pittsburgh, representative for the Chevrolet automobile, has plans under way for a new two-story service, repair and garage building, to cost about $85,000 with equipment. A. M. Bowman, Bessemer Building, is engineer.

St. Louis

ST. LOUIS, Sept. 5.

PROPERTY, 150 x 300 ft., on West Worth Street, Marshall, Mo., has been acquired by the Nicholas-Beazley Airplane Co., Marshall, as a site for a new plant, to specialize largely in the production of monoplanes. The main unit will be one-story, 80 x 160 ft.; an assembling department will be installed. The initial works are reported to cost close to $40,000, with equipment.

The Kansas City Public Service Co., Fifteenth Street and Grand Avenue, Kansas City, Mo., has plans for a one and two-story equipment storage and distributing plant, 75 x 137 ft., with welding and repair shop, reported to cost about $70,000 with equipment.

The Miller Cereal Mills, Twenty-sixth and Center Streets, Omaha, Neb., will soon begin the erection of a new five-story and basement mill, 60 x 125 ft., to cost approximately $75,000 with machinery.

The Roxana Petroleum Corporation, Shell Building, St. Louis, is reported to be planning the construction of a new distillation plant unit in the Oxford district, near Oklahoma City, Okla., to cost upward of $175,000 with machinery.

The American Pulverizer Co., Eighteenth and Austin Streets, St. Louis, manufacturer of pulverizing and grinding machinery, etc., has awarded a general contract to the W. C. Harting Construction Co., 722 Chestnut Street, for a new one and two-story plant, 80 x 145 ft., on site recently acquired. Wolte & Nauman, Fullerton Building, are architects.

Ovens, power equipment, conveying and other machinery will be installed in the two-story and basement plant, 140 x 155 ft., to be erected by the General Baking Co., Wichita, Kan., to cost about $175,000 with equipment. Headquarters of the company are at 342 Madison Avenue, New York.

The Board of Education, Nebraska City, Neb., plans the installation of manual training equipment in its proposed three-story junior high school, to cost $165,000, for which bids will soon be asked on general contract. J. H. Felt & Co., 300 West Forty-seventh Street, Kansas City, Mo., are architects.

The Common Council, Campbell, Mo., is reported to be planning the construction of a municipal electric light and power plant.

The Kansas Power Co., Liberal, Kan., will build a one-story ice-manufacturing plant, to cost $60,000.

The Brown Instrument Co., Philadelphia, has opened a branch office at 509 Mutual Building, Kansas City, Mo., to serve Kansas, Nebraska, western Missouri and Council Bluffs, Iowa. F. M. Poole is in charge.

The Bar-Rusto Corporation, 1808 Locust Street, Kansas City, Mo., has been organized to engage in rust proof non-corrosive metal finishing and operate a retinning plant for dairy equipment. It has exclusive rights in western Missouri and eastern Kansas on cadmium and chromium plating processes owned by the Udylite Process Co. and the Metals Protection Corporation respectively. All equipment has been purchased and the company expects to have its plant in operation by Sept. 20.

Buffalo

BUFFALO, Sept. 5.

THE Board of Education, High School Building, Niagara Falls, N. Y., will ask bids late in September for a new three-story vocational school, to cost in excess of $400,000 with equipment. Walter McCulloh, Gluck Building, is architect; Beeman & Candee, White Building, Buffalo, are mechanical engineers.

The International Railway Co., Main Street and Michigan Avenue, Buffalo, has plans for a one-story automobile service, repair and garage building for motor bus service, to cost more than $70,000 with equipment.

The Smith Home Appliance Co., Inc., Syracuse, N. Y., is said to be completing plans for a new one-story factory, to cost about $25,000 with equipment.

The Empire Gas & Electric Co., Geneva, N. Y., is arranging for a merger with the Seneca Power Corporation, Seneca Falls, N. Y. An expansion and improvement program will be carried out, including transmission line construction.

Cincinnati

CINCINNATI, Sept. 5.

THE Island Creek Coal Co., Dixie Terminal Building, Cincinnati, has taken out a permit for a new coal-screening plant.

Bids will soon be asked on general contract by the Fairmont Creamery Co., 229 West Spring Street, Columbus, Ohio, for a four-story cold storage and refrigerating plant on adjoining site, and one-story automobile service, repair and garage building, to cost $130,000 with equipment. F. V. Thomas is company architect, address noted.

The Brown-Craven Equipment Co., 706 Manning Street, North, Chattanooga, Tenn., machinery dealer, has inquiries out for a sand and gravel ladder dredge, complete with screening plant, etc., with capacity of about 1000 yd. per day.

The Iseman Flying Field, Inc., Paducah, Ky., J. H. Iseman, 3200 Broadway, head, recently organized, is planning the establishment of an aircraft landing field on the Clark River Road, with hangars, machine and repair shop, oil storage and distributing buildings, etc. Charles R. Iseman will also be an official of the company.

The Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Sept. 15 for 32,000 piston rings, circular 75; until Sept. 26 for 1369 aircraft generators, circular 69; until Sept. 12 for ski assemblies, including hub bushings, shock absorber shackles, shock absorber cable assemblies, etc., circular 77; and until Sept. 14 for light and streamline assemblies, circular 71.

The Springfield Metallic Casket Co., North Street, Springfield, Ohio, has awarded a general contract without com-

petition to J. A. Poss, New Zimmerman Building, for a four-story addition, to cost about $180,000 with equipment. It is understood that construction may be deferred for several weeks.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, is arranging for the establishment of a new factory branch and distributing plant at Springfield, Ohio. A building, totaling about 16,000 sq. ft. of floor space, is being leased for the initial unit. Later it is proposed to acquire a site and erect larger works.

The L. J. Breed Equipment Co., James Building, Chattanooga, Tenn., machinery dealer, has inquiries out for a pile driver.

The Reed Air Filter Co., 215 Central Avenue, Louisville, Ky., manufacturer of unit and streamline filters has let contract to the Austin Co. for a new plant which will double its present floor space.

Chicago

CHICAGO, Sept. 5.

PURCHASES of machine tools are more numerous but are widely scattered and of small size. Fresh inquiry shows some improvement but as yet does not indicate much more activity than in August. Recent purchases include a 4-in. and a 2½-in. forging machine for the Santa Fe Railroad and a cylinder boring machine for the International Harvester Co. for delivery at Milwaukee. The Wisconsin Steel Co. is asking for prices on a 72-in. open-side planer and a 42-in. double-housing planer. The Board of Education, Chicago, will buy an 18-in. band saw and a two-wheel floor grinder.

The following list has been prepared by the J. I. Case Threshing Machine Co., Racine, Wis.

24-in. geared shaper.
Universal milling machine.
8-in. x 22-in. surface grinder.
Disk grinder with two 18-in. wheels.
Double-end shear for 4½-in. x 4½-in. x ½-in. angles.
400 lb. drop hammer.
Two spindle, 1-in. bolt pointer.
Hydraulic shaft straightener.
10-ft. power square shear for 10 gage material.
4-ft. power square shear for 14 gage material.
Portable alligator shear.
Gang slitter, 40-in. wide, 3 cuts in 14 gage material.

The Kutscheid Mfg. Co., 911 West Forty-ninth Place, Chicago, manufacturer of Peerless steel squaring shears, has purchased a new 300-amp. electric arc welder. The John Wood Mfg. Co., Chicago, has ordered a ¼-in. x 10-ft. capacity all-welded steel shear from the Kutscheid company.

The machinery equipment, real estate and buildings of the Tri-City Malleable Castings Co., East Moline, Ill., will be sold at public auction, Sept. 7 and 8. The factory building is 120 x 380 ft., four stories, and occupies a six-acre tract. The equipment consists of all machinery and general tools required for an up-to-date malleable foundry.

Plans are being prepared by Long & Thorshove, Minneapolis, Minn., for a new power plant for the City Hospital. The entire project will cost $200,000.

The Frank Foundries Co., Moline, Ill., is said to be planning a new one-story foundry unit, to cost in excess of $250,000 with equipment. W. C. Hagebaeck is general manager.

The Turner Simplicity Engine Co., 412 First Avenue, Oskaloosa, Iowa, is arranging for the erection of a new one-story plant, to cost about $35,000 with equipment. It will replace a factory unit recently destroyed by fire.

The new service and repair building to be erected by the Chicago-Nash Co., 2000 South Michigan Avenue, Chicago, at Indiana and Prairie Avenues, will comprise a three-story and basement unit, 170 x 200 ft., to cost about $400,000 with equipment, instead of a smaller amount previously noted. G. W. Klewer, 5 North La Salle Street, is architect and engineer.

The Iowa-Nebraska Light & Power Co. has been organized to take over electric light and power properties in Iowa and Nebraska, including the Iowa Service Co., with headquarters at Omaha, Neb.; Havelock Electric Light Co., Havelock, Iowa; Lincoln Public Service Co., Lincoln, Neb.; and the Nebraska Gas & Electric Co., Omaha. The new organization has arranged for a bond issue of $12,000,000, a portion of the proceeds to provide for the consolidation and for extensions and improvements.

The Chicago, Milwaukee & St. Paul Railway Co., Minneapolis, Minn., is said to be planning an early call for bids for a new electrically operated freight-handling crane for installation at its local outbound freight house at Third Avenue South and Second Street.

The Barber-Coleman Co., Rockford, Ill., manufacturer of taps, drills and other metal-cutting tools, has awarded a general contract to the Security Building Corporation, Rockford, for a one-story addition to cost about $40,000 with equipment.

The Board of Education, Virginia, Minn., plans the installation of manual training equipment in a new two-story junior high school estimated to cost upward of $600,000, for which it is expected to ask bids on a general contract about the middle of September. E. H. Berg, 407 Jones Street, Eveleth, Minn., is architect; G. M. Orr, Baker Building, Minneapolis, Minn., is engineer.

The Board of Education, Downers Grove, Ill., plans the installation of manual training equipment in a new three-story high school to cost $200,000, for which superstructure will begin at once. Royer, Danley & Smith, Flat Iron Building, Urbana, Ill., are architects.

Gulf States

BIRMINGHAM, Sept. 5.

BIDS are being asked by the Todd Engineering, Dry Dock & Repair Co., Fulton Street, New Orleans, until Sept. 12 for extensions and improvements in its shipbuilding and repair plant, including a new one-story shop unit, 50 x 200 ft., with craneway; elevated road crossings, extensions in locomotive crane track, decking structure, etc. A. M. Shaw, Pere Marquette Building, is engineer.

The Texas-Louisiana Power Co., Fort Worth, Tex., will arranged for a bond issue of $500,000, a portion of the proceeds to be used for expansion and improvements in power plants and system.

The Merchants' Transfer Co., San Antonio, Tex., will proceed with the superstructure for a new cold storage and refrigerating plant 240 x 436 ft. A one-story automobile service, repair and garage building, 60 x 120 ft., will also be erected, as well as a freight garage depot, 20 x 260 ft. The entire project will cost in excess of $850,000 including equipment. Herbert S. Green, Alamo Bank Building, is architect.

The Electra Cotton Oil Mill, Electra, Tex., recently formed by W. M. Austin and R. B. Magee, both of Electra, and associates, has plans for the erection of a one-story cottonseed oil mill to cost about $25,000.

The Universal Aircraft Co., 200 South Boaz Street, Fort Worth, Tex., has plans under way for a new plant for airplane assembling. A hangar will be constructed and machine shop provided exclusively for repair work and parts production for reconditioning aircraft.

The Board of City Commissioners, City Hall, Monroe, La., is asking bids until Sept. 21 for equipment for the municipal waterworks, including two 4200-gal. per min. domestic service pumps; two 4200-gal. per min. fire service pumps; one 750-gal. per min. wash water pump, all centrifugal type, motor-driven; also for a 10-panel electric switchboard and auxiliary equipment; one 100,000-gal. capacity steel tank on 40-ft. steel tower and one 500,000-gal. capacity steel tank on 125-ft. tower; filter equipment, operating tables, controllers, chemical-handling equipment, etc. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

The Bent Concrete Pipe Co., Los Angeles, has leased property at Amarillo, Tex., totaling about 80,000 sq. ft., and plans the early erection of a branch plant to cost about $25,000 with machinery.

The Mid-Kansas Oil & Gas Co., Del Rio, Tex., is planning the early construction of a new oil storage and distributing plant, with initial capacity of about 2,000,000 bbl. It will be the terminus of the new pipe line which the Illinois Pipe Line Co., is building from the Pecos County oilfields, about 100 miles distant. The Mid-Kansas company also contemplates the construction of a local oil refinery later to cost more than $200,000 with machinery.

The Bal-Tex Spring Bed Co., Second and Hickory Streets, Dallas, Tex., has purchased a building and will remodel for a new plant; an addition will be constructed. The project is estimated to cost close to $80,000 with equipment.

The Alabama Chemical Co., Montgomery, Ala., plans to rebuild the portion of its sulphuric acid plant recently destroyed by fire, with loss reported at close to $185,000 including machinery.

The Railroad Crossing-Signal Corporation, 308 Wheat Building, Fort Worth, Tex., has been organized to make an automatic signal device for railroad crossing approaches. The company expects to equip its own factory for manufacturing as soon as funds are available.

The Standard Vaporizer Co., Inc., 418 Meaher Building, Mobile, Ala., has been organized to manufacture automobile

fuel economizers. It plans to purchase the various parts and do its own assembling and is in the market for black or nickel plated ⅛-in. standard pipe fittings; brass, plain or nickel plated ¼-in. standard pipe fittings; 18-gage brass spring wire in coils or springs; ¼-in. or ⅜-in. brass tubing, and ⅜-in. brass rods.

Cleveland

CLEVELAND, Sept. 6.

WHILE machine tool sales during the week have been light, some manufacturers report the receipt of more inquiry and look for a gain in orders this month. This, however, is not expected to develop in some lines of equipment until after the National Machine Tool Exhibition in Cleveland, starting Sept. 18. Quite a little business is evidently being held up until after this exhibition.

Business with machine tool builders and with some dealers showed a slight gain in August over July. Purchases of the larger types of machines during the week included a 60-in. extra heavy planer by the Erie Forge Co., Erie, Pa., and a No. 7 Newark gear cutter by the Toledo Machine & Tool Co., Toledo. The market in the Detroit territory continues extremely dull, as little business is coming from the automotive industry. No inquiries are pending from railroads in this territory.

The Sterling Mfg. Co., 2831 Prospect Avenue, Cleveland, has acquired manufacturing space in the McBride Building, East Fortieth Street and Perkins Avenue, which it will use for the manufacture of radio socket power units.

Equipment of the plant of the Vig-Tor Exle Co., 5101 Lakeside Avenue, Cleveland, will be sold at auction Sept. 14. This will include Universal milling machines, shapers, lathes, planers, drilling machines and grinders and small tools.

The City Council, Defiance, Ohio, will have plans drawn for a municipal electric light and power plant, to cost $405,000 with machinery. Bonds in this amount have been approved.

The Celina Specialty Co., Celina, Ohio, manufacturer of furniture, is considering the rebuilding of the portion of its plant destroyed by fire Aug. 25, with loss reported upward of $200,000, including machinery.

The Ditwiler Mfg. Co., Galion, Ohio, manufacturer of steel bodies for motor trucks, etc., is said to have plans for a one-story plant, 150 x 500 ft., to cost close to $100,000 with equipment. It will replace a works recently destroyed by fire.

The General Motors Corporation, Detroit, has awarded a general contract to H. Berkebile & Sons, Whittier Street, Toledo, Ohio, for its proposed four-story service, repair and sale building to cost approximately $300,000 with equipment.

Indiana

INDIANAPOLIS, Sept. 5.

OREN WELCH, Anderson, Ind., and associates have acquired the local plant of the Anderson Aircraft Co., from the Citizens' Bank, receiver. The new owners are forming the Oren Welch Airplane Co., to take over and operate the plant. The company is arranging for the purchase of an adjoining tract of about 40 acres for enlargements, and for the establishment of an airport, with hangars, repair facilities, etc.

The Board of Education, 150 North Meridian Street, Indianapolis, will soon take bids on a general contract for a new two-wing, three-story addition to the technical high school at 1600 East Michigan Street, with manual training division, to cost about $250,000. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

The Indiana Steel & Wire Co., Muncie, Ind., has asked bids on a general contract for a one and two-story addition, to cost close to $75,000 with equipment.

The Board of Trustees, Methodist Hospital, Sixteenth and Capitol Avenue, Indianapolis, is completing plans for new three-story and basement power house, to cost in excess of $200,000 with equipment. D. A. Bohlen & Son, Majestic Building, are architects.

The Board of Education, Elkhart, Ind., is reported planning the installation of manual training equipment in a two-story and basement addition to the high school, to cost approximately $115,000. Hubert Miller, Monger Building, is architect.

The Oolitic Stone Co., Western Union Building, Bloomington, Ind., manufacturer of artificial stone products, has plans under way for a new mill to cost more than $50,000 with equipment.

James S. Marlowe, State Life Building, Indianapolis, has been appointed representative in Indiana for the Fitzsimons Co., Youngstown, manufacturer of cold drawn steel in rounds, squares, hexagons and flats.

Canada

TORONTO, Sept. 5.

MACHINERY and machine tool sales resulting from exhibits at the Canadian National Exhibition now being held in Toronto have stimulated business during the week. Inquiries are also improving and both dealers and builders look for a general strengthening in machine tool demand during the new few months. The erection of a number of new plants throughout the Dominion has advanced to a point where those interested are now ready to turn their attention to equipment requirements. Several large lists are expected to appear within the next few weeks in this connection as feelers have already been sent out. While the demand for second hand and rebuilt tools continues strong, buyers are giving more attention to more modern lines and labor and time saving equipment is gradually becoming more prominent in current sales. Demand for small tools continues good.

The Hydro Electric Power Commission of Ontario, University Avenue, Toronto, has purchased 12 acres at Leaside as a site for the new transmission station to take care of power from the Gatineau River electric power supply. An expenditure of $5,000,000 will be made on the plant within a year and it is expected that a further expenditure will be made later. The Hydro Electric Power Commission is now receiving bulk and separate tenders in connection with the project, but no closing date has been set. F. A. Gaby is chief engineer.

Harry Atkinson, Ltd., has submitted plans for approval to Hon. Honore Mercier, Minister of Mines, Provincial Government, Quebec, for 15 water power development plants to be located on the Etchemin River.

William Phillips, manager Industrial Department of the Canadian National Railways, Montreal, states that work will start this fall on the proposed $2,000,000 cold storage plant at the Ocean Terminals, Halifax, N. S. Drury & Co., will handle all contracts and tenders for construction.

George C. Walker, 32 Tiffany Street, Guelph, Ont., has the general contract for an addition to the factory of Mullers' Carriage Works, Guelph. Coales & Dangfield, 29½ Douglas Street, are architects.

The Steel Co. of Canada, Ltd., head office, Hamilton, Ont., is completing plans for a $15,000 addition to its plant at Swansea, Ont. J. Robert Page, 18 Toronto Street, Toronto, is general contractor. Structural steel will be supplied by the Dominion Bridge Co., Ltd., Toronto.

The Ribago Copper Corporation, Ltd., Haileybury, Ont., will purchase complete mining plant equipment. G. A. Bagshaw is president.

The Foundation Co. of Canada, Ltd., 746 Sherbrooke Street West, Montreal, has the general contract for a $150,000 factory addition for the Canadian Goodrich Rubber Co., Ltd., 521 King Street West, Kitchener, Ont. The Standard Steel Construction Co., 55 Maine East, Welland, Ont., has the steel contract. Bernard H. Prack, 42 James Street North, Hamilton, Ont., is the architect.

F. V. Skinner, manager of the Skinner Co., Ltd., Gananoque, Ont., manufacturer of hardware, castings, automobile accessories, etc., is receiving bids for the erection of an addition to its plant to cost $50,000. W. B. Galbraith, 615 Yonge Street, Toronto, is architect.

The Hamilton Gear & Machine Works, Ltd., 76 Van Horne Street, Toronto, has let the steel contract to McGregor & McIntyre, Ltd., 1139 Shaw Street, in connection with an addition to its plant.

The D. T. Jones Mfg. Co., Ltd., Gananoque, Ont., plans an addition to its shovel factory.

The Canadian Paperboard Co., Montreal, has concluded negotiations for a site of 9 acres on the south side of Commissioner Street at the foot of Carlaw Avenue, Toronto. Plans call for the immediate erection of a paper mill to cost approximately $1,000,000, and to have an initial capacity of 75 tons per day. Ultimately the company plans to install a second unit bringing the capacity up to 150 tons per day

Tenders will probably be called at an early date by Kelly & Chase, engineers, Confederation Life Building, Toronto, for the main building, two stories, 150 x 700 ft., with two L-shaped extensions. The local office of the Canadian Paperboard Co. is 32 Front Street West, Toronto.

The Dominion Envelopes & Cartons, Ltd., Toronto, has negotiations under way for a site on Fleet Street, Toronto, for the erection of a $1,000,000 plant. It will be operated by the Dominion Box Boards, Ltd., which will be controlled by the Dominion Envelopes & Cartons, Ltd. As soon as arrangements are made with the Harbor Board, construction work will start under the direction of J. L. Carey, Chicago.

Pacific Coast

SAN FRANCISCO, Aug. 31.

THE Pacific Portland Cement Co., Consolidated Pacific Building, San Francisco, has authorized plans for rebuilding the portion of its mill at Plaster City, Nev., recently destroyed by fire with loss approximating $150,000, including equipment.

The Crane Co., San Francisco, with headquarters at 836 South Michigan Avenue, Chicago, will take bids at once for a new factory branch and distributing plant addition, including extensions in pipe shop, at Second and Brannon Streets, San Francisco, to cost about $60,000, with equipment. Lewis P. Hobart, Crocker Building, is architect.

The Board of County Supervisors, Bakersfield, Cal., has authorized plans for extensions and improvements at the County airport, including the construction of two hangars, repair and reconditioning shop, oil house, etc. Charles H. Biggar, Bank of Italy Building, is architect.

J. L. Doherty, 275 South Cedar Street, Burbank, Cal., associated with V. E. Vepagh, engineer for the Glendale Crystal Ice Co., Glendale, Cal., is planning the early construction of a new ice-manufacturing plant at Burbank to cost $55,000 with equipment.

Reed & Corlett, Oakland Bank of Savings Building, Oakland, Cal., architects, have plans for a three-story and basement automobile service, repair and garage building, to cost about $115,000 with equipment.

The Hawley Pulp & Paper Co., Oregon City, Ore., has filed plans for a new factory branch and distributing plant at Portland, to cost about $75,000 with equipment. General contract has been let to Arthur & Sons, Inc., Worcester Building, Portland.

The Bauer Cooperage Co., 55 Hampshire Street, San Francisco, manufacturer of wirebound kegs, barrels, etc., has asked bids on a general contract for a new one-story plant, to cost in excess of $100,000 with equipment. It will replace a works destroyed by fire several weeks ago.

The Southern Pacific Co., San Francisco, is reported to be planning the construction of an ice-manufacturing and cold storage plant at Santa Clara, Cal., to cost more than $350,000 with equipment.

The Button Wire Co., Oakland, Cal., recently organized, has arranged for the establishment of a plant at First and Linden Streets, to specialize in the production of patented buttons used on wire for stucco wall construction, and other kindred specialties. It is planned to open factory branches at San Francisco and Los Angeles at an early date. The company is headed by B. F. Snyder, J. W. Meyer and T. R. Vincent.

The Transit Mixers Co., Inc., Call Building, San Francisco, has been organized to manufacture the Paris Transit concrete mixer. At present the product will be manufactured both in the East and West by contract but under the direction of the company's engineering department.

Foreign

THE Ministry of Public Works, Santiago, Chile, is completing plans for the construction of new port works at Valdivia, to cost more than $3,000,000, including buildings, elevating and conveying machinery, cranes and other material-handling equipment. It is expected to ask bids for a portion of the work in September. The American Consulate, Santiago, C. Van H. Engert, Charge d'Affaires, has information regarding the project.

Vogel & Rosenkranz, Lowerstrasse 20, Offenbach am Main, Germany, are inquiring for cam shaft milling machines, cam milling machines and cam shaft grinding machines. It is requested that correspondence be conducted in French or German if possible.

The Colonial Government, Curacao, Dutch West Indies, has authorized a fund of about 2,000,000 guilders ($800,000), for the purchase and installation of equipment for the distillation of salt water for municipal service. Name of official in charge and information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Curacao No. 252307; also, at the American Consulate, Curacao, S. L. Wilkinson, consul.

The Ministry of Agriculture, Warsaw, Poland, is completing plans for the construction of a series of grain elevators in different parts of the country, with screening, elevating, conveying and kindred equipment. The first such unit is expected to be located at Oswiencim, with the second at Thorn and another at Gdynia. The entire project is expected to cost close to $1,500,000.

The Burmah Co., Rangoon, Burma, has an expansion program in progress at its Syriam oil refinery, to include the installation of cracking and other equipment.

President Siles of Bolivia has announced that the La Pas-Yungas Railway, the initial construction of which was begun in 1915, will be completed at once. Thus far the railroad has been extended 130 miles; if completed to the head of steam navigation on the river El Beni, as originally planned, about 88 miles of additional construction would be required.

The Argentine Government has decided to construct the Costanero Canal through its Ministry of Public Works, according to advices received from Vice Consul Cecil W. Gray, Buenos Aires, and made public by the Department of Commerce. Government machinery, dredges and other equipment will be used, thereby accomplishing a considerable saving as compared with the cost of the work by private contractors. This year's budget provides for an expenditure of 2,000,000 pesos for the canal.

A recent decree of the President of Venezuela provides for an additional credit of 2,000,000 bolivars (value of bolivar is approximately 19c.) for the Department of Public Works, bringing the total now available for this department for the fiscal year 1927-28 to 38,000,000 bolivars, according to Consul H. M. Wolcott, Caracas. Of this amount, 37,405,440 bolivars will be spent for construction, conservation and reparation of public works, purchase of materials and supplies, transportation, salaries of engineers, etc.

A commission which was appointed by the city of Milan, Italy, last January to study the possibilities of constructing a subway for that city similar to those in New York, Paris and London, has recently published its report, according to Consul General T. Jaeckel, Milan. The commission believes that the construction of different lines of subways would involve too great an expense and recommends an alternative plan costing about 50,000,000 lire. This plan, which has already been approved by the city, involves the construction of two short tunnels for the purpose of carrying the four principal tramway lines to the Piazza del Duomo, the center of the city. A specially incorporated contracting firm will construct the tunnels in question.

The Freyn Engineering Co., Chicago, has reopened its office at 38 Victoria Street, Westminster, London. At its home office the company is organizing a department to handle its foreign business, notably the recent contracts with Soviet Russia, Germany and Luxemburg.

The South American Gulf Oil Co., 21 State Street, New York, has taken over leases of oil lands in the Valenzuela district, Colombia, totaling about 700,000 acres, heretofore held by the Colombia Syndicate, including oil-drilling and other equipment of the last noted organization. Plans are maturing for extensive operations and development, continuing present leases and providing additional equipment and facilities for expansion in oil-producing lands, with pipe lines, storage facilities, etc.

The Bush Terminal Co., 100 Broad Street, New York, is arranging for the early construction of additional units at its terminal at London, England, consisting of two large multi-story structures on sites adjacent to present building, with installation of elevating, conveying and other machinery. Irving T. Bush, president, is now in London to complete arrangements for the expansion, which is reported to cost more than $850,000.

By a recent official decree, the Czechoslovak Ministry of Commerce abolished fees for import and export licenses covering many important articles, according to the Foreign Tariffs Division of the Department of Commerce. For most of the articles affected the former fee amounted to one-half of 1 per cent of the invoice value of the goods. Among the import commodities affected by this decree are certain kinds of machinery, dynamos and electric motors, automobiles and airplane motors, and optical instruments.

The Keystone Steel & Wire Co., Peoria, Ill., for the year ended June 30, reports net income of $1,015,591, after interest, depreciation, federal taxes and all other charges, equal after preferred dividend requirements to $26.18 a share earned on the $3,371,400 of common stock. This compares with $500,857 or $11.69 a common share in the previous year. Net sales in the last fiscal year totaled $9,054,022, as compared with $8,232,974 in the previous fiscal year.